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DEATHS FROM APPENDICITIS.¹

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THERE is evidence from many parts of the world that more people each year are dying from appendicitis.

Table I shows the mortality for Victoria, Queensland, England and Wales, and the United States of America.

At the same time there is a vast increase in the number of cases of appendicitis treated in public hospitals all over the world, with a steadily decreasing case mortality.

Table II shows the record for Victorian public hospitals and similar figures have been published

for many other hospitals. These figures include all types of appendicitis.

The increase of cases treated in public hospitals is no doubt partly due to the greatly increased use that is being made of charitable institutions, and partly to the fact that many more patients with mild inflammatory attacks are being admitted and operated on. These patients do not die and thus their inclusion improves our statistics and blinds us to the fact, emphasized by Wilkie and Willis, that the mortality for the severe types of appendicitis is as high as or even higher today than it was twenty years ago.

Rendle Short and Sherren have said that the incidence of appendicitis has not increased much since 1905, and it may be that the apparent increase in our surgical figures is due to the fact that a far greater proportion of the patients with mild appendicitis are now operated on.

¹ Read at a meeting of the Victorian Branch of the British Medical Association on August 8, 1934.

TABLE I.

| Year. | Victoria. | | Queensland (A. E. Lee). | | England and Wales (Adams). | |
|-------|-------------------|---------------------------------|-------------------------|---------------------------------|----------------------------|---------------------------------|
| | Number of Deaths. | Rate per Million of Population. | Number of Deaths. | Rate per Million of Population. | Number of Deaths. | Rate per Million of Population. |
| 1910 | .. | | | 36 | 60 | |
| 1913 | .. | | | | 2,523 | 69 |
| 1914 | .. | | | | 2,684 | 71 |
| 1915 | .. | | | | 2,503 | 67 |
| 1916 | .. | 102 | 72 | | 2,608 | 70 |
| 1917 | .. | 78 | 55 | | 2,443 | 67 |
| 1918 | .. | 87 | 62 | | 2,416 | 66 |
| 1919 | .. | 94 | 66 | | 2,429 | 66 |
| 1920 | .. | 89 | 61 | 52 | 2,531 | 67 |
| 1921 | .. | 95 | 63 | | 2,711 | 72 |
| 1922 | .. | 88 | 57 | 57 | 2,735 | 72 |
| 1923 | .. | 105 | 64-25 | 69 | 2,826 | 74 |
| 1924 | .. | 112 | 70 | 60 | 2,756 | 72 |
| 1925 | .. | 123 | 75 | 69 | | |
| 1926 | .. | 112 | 67 | 88 | 2,862 | 74 |
| 1927 | .. | 126 | 74 | 84 | | |
| 1928 | .. | 129 | 75 | 71 | | |
| 1929 | .. | 133 | 76 | 71 | | |
| 1930 | .. | 126 | 71 | 73 | | |
| 1931 | .. | 152 | 85 | 72 | | |
| 1932 | .. | 125 | 75-8 | | | |
| 1933 | .. | 126 | 69 | | | |

TABLE IA.
U.S.A. (Willis).

| Year. | Rate per Million. |
|-----------|-------------------|
| 1901-1905 | 110 |
| 1906-1910 | 112 |
| 1911-1915 | 121 |
| 1916-1919 | 124 |
| 1920 | 134 |
| 1921-1922 | 144 |
| 1930 | 180 (Trueadell) |

TABLE II.
Victorian Hospital Records, for Year Ending June 30.

| Year. | Cases. | Deaths. | Case Mortality. |
|-------|--------|---------|-----------------|
| 1915 | 1,408 | 74 | 5.3 |
| 1916 | 1,325 | 54 | 4.1 |
| 1917 | 1,270 | 32 | 2.5 |
| 1918 | 1,503 | 45 | 3.0 |
| 1919 | 1,458 | 48 | 3.3 |
| 1920 | 1,800 | 48 | 2.7 |
| 1921 | 1,834 | 40 | 2.2 |
| 1922 | 1,818 | 47 | 2.6 |
| 1923 | 2,077 | 43 | 2.1 |
| 1924 | 2,067 | 63 | 3.2 |
| 1925 | 2,887 | 56 | 1.9 |
| 1926 | 2,056 | 55 | 1.8 |
| 1927 | 3,286 | 75 | 2.3 |
| 1928 | 3,455 | 67 | 1.9 |
| 1929 | 3,403 | 79 | 2.3 |
| 1930 | 3,589 | 63 | 1.8 |
| 1931 | 3,335 | 60 | 1.8 |

TABLE III.
London Hospital Records.¹

| Condition. | 1900-1904. | | | 1912-1913. | | | 1920-1923. | | |
|---|------------|---------|-----------------------|------------|---------|-----------------------|------------|---------|-----------------------|
| | Cases. | Deaths. | Mortality Percentage. | Cases. | Deaths. | Mortality Percentage. | Cases. | Deaths. | Mortality Percentage. |
| Acute, without general peritonitis or abscess | 40 | 6 | 15.0 | 407 | 7 | 1.7 | 1,100 | 35 | 3.18 |
| General peritonitis | 166 | 127 | 76.5 | 80 | 16 | 20.0 | 230 | 47 | 20.5 |
| Abscess | 431 | 35 | 8.1 | 211 | 7 | 3.3 | 347 | 16 | 4.6 |
| Total | 637 | 160 | 26.4 | 698 | 30 | 4.3 | 1,677 | 98 | 5.8 |

¹ Only the acute cases in Lett's series are included.

In 1905 Hugh Lett investigated a series of 1,000 cases of appendicitis occurring in patients treated at the London Hospital between 1900 and 1904, and in 1914 he collected records of a similar series of patients treated in 1912 and the early part of 1913. His figures and those published by McNeill Love in 1924 are grouped in Table III.

Between 1904 and 1912 the improvement of mortality rate was amazing, and Table IV shows that it was due partly to the great increase in the proportion of cases operated on before general peritonitis or abscess had developed, and partly to the vast improvement in the mortality rates for all types of cases.

Unfortunately the figures for 1920-1923 show an increase in the mortality rate for all types of cases and an increase in the total mortality, despite a still greater proportion of uncomplicated cases.

It is this back-sliding of mortality figures that is causing concern in all parts of the world. Table V shows the mortalities of a number of series of reported cases collected at random from the literature.

The main facts in the mortality are well illustrated in a series of cases that I have reviewed from the Alfred Hospital records and are worthy of brief consideration.

TABLE IV.
Percentage Distribution of Cases in Table III.

| Condition. | 1900-1904. | 1912-1913. | 1920-1923. |
|---------------------|---------------------|--------------------|---------------------|
| Acute | 6% (15% died) | 58% (17% died) | 65% (3-18% died) |
| Diffuse peritonitis | 26% (76-5% died) | 12% (20% died) | 14% (20-5% died) |
| Abscess | 68% (8-1% died) | 30% (3-3% died) | 21% (4-6% died) |
| Total mortality | 26.4% | 4.3% | 5.8% |

TABLE V.
Mortality among Patients Treated by Immediate Operation.

| Author. | Source. | Number of Cases. | Percentage Mortality. |
|--------------------|-------------------------------|------------------|-----------------------|
| Nuttall | Personal. | 551 | 2.54 |
| Raw | Personal. | 619 | 2.58 |
| E. P. Quain | The Quain and Ramsted Clinic. | 2,000 | 3.25 |
| Truesdell | Personal. | 259 | 3.9 |
| C. J. O. Brown | Alfred Hospital. | 1,069 | 3.9 |
| St. Leger Brockman | Royal Infirmary, Sheffield. | 1,068 | 4.7 |
| Alan Newton | Melbourne Hospital. | 995 | 4.9 ¹ |
| Grey Turner | Personal. | 1,365 | 5.7 |
| J. McNeill Love | London Hospital. | 1,677 | 5.8 |
| Joseph E. Adams | Saint Thomas' Hospital. | 961 | 8.4 |
| C. J. Miller | New Orleans. | 2,415 | 9.9 |

Mortality among Patients Treated by Delayed Methods.

| | | | |
|-----------------------|-------------------------|------------------|------|
| Le Grand Guerry | Personal. | 1,534 | 1.23 |
| Bailey | Personal. | 315 | 1.58 |
| Deaver | Personal (1910). | 315 | 2.85 |
| Beaton | Personal. | 273 ² | 3.3 |
| J. McNeill Love | London Hospital. | 341 | 3.5 |
| Adams | Saint Thomas' Hospital. | 214 | 4.2 |
| Sworn and Fitz-gibbon | Saint Thomas' Hospital. | 2,126 | 4.46 |

¹ Excluding two cases not operated on and one death under anaesthesia.² Including 114 subacute and quiescent cases.

During the last eight years 3,037 cases were classified in the hospital records as acute appendicitis, and in these cases 96 of the patients died, giving a mortality rate of 3.16%. Between July 1, 1926, and June 30, 1930, there were 1,304 cases with 42 deaths (3.2% mortality), but on examining the histories I was unable to obtain satisfactory evidence of the state of the appendix at operation in 235 cases.

There remain for the first four-year period 1,069 cases of undoubtedly acute appendicitis, and if these only are considered, the mortality rate is 3.9%.

I have not completed a detailed examination of the histories for the second four-year period, so my review is limited to the period from July 1, 1926, to June 30, 1930.

Tables VI and VII demonstrate the distribution of the acute cases in accordance with the duration of illness at the time of operation, and the age and sex of the patients. The cases have been grouped into those without general peritonitis or abscess, those with general peritonitis and those with abscess.

Pathological Condition at Operation.

Patients in the first group had unruptured appendices or, if ruptured, the appendix was so wrapped in omentum or localized by adhesions or by its position that only a localized peritonitis had occurred and an abscess had not yet formed. Many of the patients had large amounts of clear or turbid fluid in the peritoneal cavity.

In cases classified as general peritonitis or abscess practically all the patients had ruptured appendices.

Under the heading general peritonitis are included only cases clinically diagnosed as general peritonitis, and with purulent peritoneal fluid and gross inflammation of all the peritoneal surfaces seen on opening the abdomen, and at least commencing dilatation of the adjacent coils of small intestine. It must be realized that with a lateral approach to the appendix only a very small portion of the peritoneum is inspected, so that it is impossible to do more than guess at the real extent of the inflammation. Under abscess are included several stages of the condition, and this is unfortunate, because prognosis and treatment are very different.

For the first column, comprising unruptured appendices and localized peritonitis, the mortality is 1.4%, and for the next two, made up of the ruptured appendices, it is 10.3%.

Influence of Age.

The influence of age is well shown in Table VII. For the first decade there is a mortality above the average, and then for two decades the mortality is less than one-third of the average. Thereafter there is a rapid rise with each decade.

Table VIII shows that there is an increased death rate from unruptured as well as ruptured appen-

TABLE VI.¹

| Days Duration. | Acute Localized. | General Peritonitis. | Abscess. | Not Given. | Total. | Male. | Female. | Deaths. | Deaths Percentage. |
|-------------------|------------------|----------------------|----------|------------|--------|-------|---------|---------|--------------------|
| One | 330 (1) | 23 (1) | 5 | 0 | 358 | 217 | 141 | 2 | 0.55 |
| Two | 268 (3) | 46 (7) | 12 (1) | 0 | 326 | 231 | 95 | 11 | 3.4 |
| Three | 111 (1) | 27 (3) | 25 (4) | 0 | 163 | 112 | 51 | 8 | 4.9 |
| Four | 25 (3) | 9 (2) | 22 (1) | 0 | 56 | 47 | 9 | 6 | 10.7 |
| Five | 11 (2) | 4 (3) | 22 (2) | 0 | 37 | 24 | 13 | 7 | 18.9 |
| Six | 5 | 3 (1) | 11 | 0 | 19 | 8 | 11 | 1 | 5.5 |
| Over six | 10 | 3 (2) | 83 (2) | 0 | 96 | 58 | 38 | 4 | 4.2 |
| Not given | 8 (1) | 1 | 4 (2) | 1 | 14 | 9 | 5 | 3 | 21.5 |
| Total | 768 | 116 | 184 | 1 | 1,009 | 706 | 363 | 42 | 3.9 |
| Deaths | 11 | 19 | 12 | 0 | 42 | 28 | 14 | | |
| Deaths percentage | 1.4 | 16.4 | 6.5 | — | 3.9 | 3.96 | 3.85 | | |

¹ Figures in parentheses represent deaths in each group.

TABLE VII.

| Days Duration. | 0-9. | 10-19. | 20-29. | 30-39. | 40-49. | 50-59. | 60-69. | 70-79. | Not Given. | Deaths. |
|-------------------|-------|--------|---------|--------|--------|--------|--------|--------|------------|---------|
| One | 9 | 128 | 125 (1) | 64 | 14 | 10 (1) | 6 | 0 | 2 | 2 |
| Two | 15 | 94 (1) | 109 (2) | 57 (2) | 27 (5) | 12 | 7 (1) | 4 | 1 | 11 |
| Three | 7 | 66 | 42 | 16 (2) | 20 (2) | 7 (2) | 4 (1) | 1 (1) | 0 | 8 |
| Four | 1 (1) | 24 (2) | 11 | 8 | 5 | 2 (1) | 3 (1) | 2 (1) | 0 | 6 |
| Five | 2 (1) | 22 | 6 | 4 (4) | 1 | 0 | 2 (2) | 0 | 0 | 7 |
| Six | 2 | 7 | 5 | 1 | 1 | 2 | 0 | 1 (1) | 0 | 1 |
| Over six | 4 | 23 (2) | 22 | 20 | 13 | 7 (1) | 5 | 2 (1) | 0 | 4 |
| Not given | 2 | 2 | 3 | 4 (1) | 1 | 2 (2) | 0 | 0 | 0 | 3 |
| Total | 42 | 366 | 323 | 174 | 82 | 42 | 27 | 10 | 3 | 42 |
| Deaths | 2 | 5 | 3 | 9 | 7 | 7 | 5 | 4 | 0 | |
| Deaths percentage | 4.8 | 1.4 | 0.9 | 5.2 | 8.5 | 16.7 | 18.5 | 40 | | |

¹ Figures in parentheses represent deaths in each group.

dices as age increases and, in addition, a much greater proportion of patients over fifty have ruptured appendices at the time of operation.

TABLE VIII.

| Group. | Cases. | | Deaths. | | Total. |
|----------|----------------------|--------------------|----------------------|--------------------|--------|
| | Unruptured Appendix. | Ruptured Appendix. | Unruptured Appendix. | Ruptured Appendix. | |
| Under 50 | 729 | 257 | 9 (1.2%) | 17 (6.6%) | 2.63% |
| Over 50 | 36 | 43 | 2 (5.5%) | 14 (32.5%) | 20.25% |

The rise in mortality with age is due to several factors.

After the age of fifty many of our patients are poor surgical risks. Arteries, heart, prostate and kidneys are beginning to show signs of wear and tear and associated conditions are directly responsible for or contributory to many of the deaths. The inflammatory attack throws an added strain on damaged viscera and the defensive reaction of the organism is impaired. In old people practically all acute appendicitis is of the obstructive type, followed by gangrene and rupture of the appendix.

Early symptoms are often comparatively mild and pain is much less severe than in young people. The peritoneal reaction in old people is often inadequate, and the usual signs of peritonitis may be absent. Often the practitioner is not called in until the third or fourth day of the attack or later, and at that time the chief complaint may be constipation with distension, and a diagnosis of intestinal obstruction is probably made. Sometimes the only sign is a hard, fixed mass in the right iliac fossa, and carcinoma of the caecum may be suspected.

In the series of 96 deaths for the full eight-year period 41 occurred among patients over fifty years of age.

Influence of Sex.

Sex does not appear to have an appreciable influence on the death rate. In this series 71% were males and the death rate was 3.96% for males and 3.85% for females. Of the males 30.7% and of the

females 38.8% were operated on within twenty-four hours of onset. Contrasting with this is the series of 235 patients excluded for lack of evidence, and of these 126 were females and 109 males. If these cases are included the proportion of males is 64%.

Sherren notes a remarkable change in sex incidence in the London Hospital. In 1903 71% were males, in 1907 65% were males, and in 1922 only 55% were males.

Rendle Short notes the same change in incidence.

Duration of Attack.

Two deaths occurred among 358 patients operated on within twenty-four hours of the onset of the illness, giving a death rate of 0.55%, and there is a steady rise in mortality until the fifth day, when seven deaths occurred in 37 patients, giving a death rate of 18.9%. After the fifth day the death rate rapidly falls to 5.5% on the sixth day, and 4.2% for patients ill more than six days at the time of operation. This fall in the death rate is largely due to successful localization of the inflammatory process, with the development of a well-shut-off abscess and alimentary equilibrium.

Actual Cause of Death.

In Table IX all the deaths for the eight-year period have been grouped together.

Ninety patients were operated on; two died under the anaesthetic and four were not operated on.

Ten deaths were due to associated disease in patients who might otherwise have been expected to recover. Fourteen deaths were due to complications of the operation, and 72 were due to the local and distant effects of infection, and of these 55 were due to general peritonitis.

Five deaths were due to proved *Bacillus welchii* infection and two others were due to gangrene and perforation of the ileum. In these no bacteriological investigations were carried out; they were probably cases of *Bacillus welchii* infection. One other patient with proved *Bacillus welchii* infection of the wound and abdominal wall recovered.

This high incidence of gas gangrene as a direct cause of death after operation for appendicitis has not, so far as I know, been noted by other writers, but perhaps suggests a further reason for the use

of gas gangrene antiserum, recommended by Williams for the control of ileus.

The deaths from intestinal obstruction occurred on the twelfth day in a simple case in which drainage had not been used, and on the ninth day in a case with a gangrenous appendix and local peritonitis in which drainage had been used.

In all but two of the cases in which death was caused by general peritonitis with ileus the appendix was ruptured at operation.

The death from pneumonia with pneumococcal peritonitis was that of a girl of seven, whose appendix is described as obstructed by a faecolith, as having a gangrenous mucosa and containing threadworms. At operation her peritoneal cavity was full of straw-coloured fluid.

TABLE IX.
Showing Actual Cause of Death in 96 Cases.

| Group. | Number. |
|---|---------|
| <i>Deaths depending on associated disease (10):</i> | |
| Diabetes | 2 |
| Chronic nephritis and cardiac failure | 2 |
| Uremia | 1 |
| Cardiac failure (1 not operated) | 3 |
| Delirium tremens with pneumonia | 1 |
| Bilateral pneumonia with pneumococcal peritonitis | 1 |
| <i>Deaths as direct complication of operation (14):</i> | |
| Post-operative hemorrhage | 3 |
| Starvation following jejunostomy | 1 |
| Post-operative intestinal obstruction | 2 |
| Pulmonary embolism | 3 |
| Anesthetic deaths (either 1, spinal "Novocain" 1) | 1 |
| Acute post-operative dilatation of stomach | 1 |
| Post-operative pneumonia (both had general peritonitis) | 2 |
| <i>Deaths depending on infection (72):</i> | |
| General peritonitis, ileus, toxæmia (2 not operated) | 55 |
| Gas gangrene (<i>Bacillus welchii</i>) of wound and abdominal wall | 4 |
| Gangrene and perforation of ileum (? organism) | 2 |
| Pelvic suppuration with <i>Bacillus welchii</i> infection of liver | 1 |
| Septicæmia (streptococcus 1, anaerobic bacillus 1, not specified 2) | 4 |
| Suppurative pylephlebitis (1 also had infarction of lung) | 2 |
| Localized suppuration in right iliac fossa with infarction of lung | 1 |
| Bilateral empyema with suppurative pericarditis | 1 |
| Ruptured empyema of gall bladder | 1 |
| General peritonitis: right subphrenic abscess, suppurative broncho-pneumonia (not operated) | 1 |

Complications.

In regard to complications in the four-year period 1926-1930, 63 serious complications occurred in 61 cases, or 5.7%, and are shown in Table X. One patient developed a femoral thrombosis and a faecal fistula and finally died of pulmonary embolism.

TABLE X.
Showing Complications from July 1, 1926, to June 30, 1930.

| Condition. | Number. |
|--|---|
| Pneumonia, right and left, with pneumococcal peritonitis | 1 (died) |
| Post-operative pneumonia | 11 |
| Empyema | 1 |
| Fecal fistula | 5 { 2 closed spontaneously, 1 closed by operation, 2 died. |
| Femoral thrombosis | 4 (1 died) |
| Secondary abscesses | 11 { 6 drained abdominally, 3 drained <i>per rectum</i> , 2 burst <i>per rectum</i> . |
| Post-operative hemorrhage (re-opened) | 1 |
| Intestinal obstruction | 3 (2 died) |
| Starvation following jejunostomy | 1 (died) |
| Pulmonary embolism | 2 (died) |
| Septicæmia | 3 (died) |
| Gas gangrene of ileum and abdominal wall | 1 (died) |
| Jaundice | 1 |
| Post-operative mania | 1 |
| Pylitis | 1 |
| Suppurative epididymo-orchitis | 1 |
| Abscess of tunics vaginalis | 1 |
| Delirium tremens | 2 (1 died) |
| Toxic peripheral neuritis of arm | 1 (died) |
| Diabetes | 2 (died) |
| Pulmonary tuberculous | 2 |
| Cardiac failure | 2 (died) |
| Bronchopneumonia, cardiac failure, chronic nephritis | 1 (died) |
| Tonsillitis | 1 |
| Diphtheria | 1 |
| Total 63 in 61 cases | 5.7% |

One patient had femoral thrombosis, faecal fistula and pulmonary embolism.

Records of wound infection and mild respiratory complications are incomplete and they are therefore not included.

Lett recorded complications in 22.9% of his series published in 1905, and 11.9% complications in the series published in 1914.

Love records 11.9% of complications among patients treated by immediate operation and 6.7% among those treated by the Ochsner-Sherren régime.

In Table XI the principal complications in some of the published series are compared, and I should like to call attention to the high incidence of secondary abscesses, intestinal obstruction and faecal fistulae shown in some of these series.

The Influence of Drainage.

In 665 cases the abdomen was closed without drainage; there were nine deaths and an average stay in hospital of 11.7 days for the survivors. In 402 cases drainage was used; there were 31 deaths and an average stay in hospital of 16.8 days for the survivors. Two patients died on the operating table and are excluded. As the tendency is to employ

TABLE XI.
Frequency of Principal Complications.

| Author. | Number of Cases. | Secondary Abscesses. | Subphrenic Abscesses. | Intestinal Obstruction. | Fecal Fistula. | Lung Infections. | Pulmonary Embolisms. | Mortality Percentage for Series. |
|----------------------|------------------|----------------------|-----------------------|-------------------------|----------------|------------------|----------------------|----------------------------------|
| Lett, 1905 | 636 | 16 | 6 | 10 | 49 | 44 | 1 | 26.4 |
| Lett, 1914 | 668 | 22 | 4 | 12 | 25 | 17 | 0 | 4.3 |
| Love, 1924 | 1,803 | 52 | 9 | 19 | 74 | 6 | 1 | 5.8 (for 1,677 cases) |
| Newton, 1931 | 995 | 8 | 9 | 5 | 15 | 48 | 0 | 4.9 |
| Quain, 1934 | 1,000 | 16 | 2 | 57 | 23 | 13 | 1 | 3.8 |
| C. J. O. Brown, 1934 | 1,069 | 11 | 0 | 3 | 5 | 14 | 2 | 3.9 |

drainage in the more severe cases, these results would be anticipated.

Twelve patients died during the first forty-eight hours after operation, and it is doubtful whether any form of treatment could have saved them. In eleven of these cases drainage was used, and in three insertion of a tube into the peritoneal cavity was the only operation done.

When drainage was used, it was in many cases limited to the insertion of a tube down to the bed of the appendix, and the tube was nearly always removed within twenty-four to forty-eight hours of operation.

Five cases of general peritonitis were treated by simple drainage with three deaths. In 73 abscesses the appendix was not removed at the primary operation; six of these patients died.

In these cases it is our practice to advise appendicectomy three to six months later, and most of the patients return for operation. Some do not return, and in some there is a recurrent attack before the time is up and immediate appendicectomy may then be possible. The 73 abscesses occurred in 67 patients. Two patients were admitted to hospital and had abscesses drained three times, and two were admitted to hospital and had abscesses drained twice during the period of review; later all four appendices were safely removed.

In 111 abscesses the appendix was removed at the primary operation with six deaths.

At first sight these figures would seem to indicate that it is safer to remove the appendix in the presence of an abscess, but in fact three of the six deaths following simple drainage occurred among patients practically *in extremis* at the time of operation and two more were a result of lung embolus.

Two enterostomies were done with one death.

In Quain's series drainage was employed for an average of 14 days in 212 cases in which abscess or localized peritonitis was present, and for an average of 16½ days in 151 cases of general peritonitis. He gives no information about the nature of his intestinal obstructions and may include cases of paralytic ileus. In these 363 cases 218 enterostomies were performed; 143 of them were done at the primary operation. Stay in hospital is not mentioned in this series.

In the London Hospital series reported by Love in 1923, drainage was employed in 55 out of 176 cases in which operation was performed within twenty-four hours of onset, and the average stay in hospital was 16·4 days. In 1,109 cases in which operation was performed after twenty-four hours, drainage was employed in 1,048, or 94·5%, and the average stay in hospital was 29·1 days.

Past History.

In this series of 42 deaths ten patients had had previous attacks of appendicitis, one had had an appendiceal abscess drained twenty-five years before, one had been operated on for gastric ulcer and the appendix had not been removed. Two had been treated medically for duodenal ulcers, two had had indigestion for many years, one had had bilious

attacks, and in one case gall-stones had been diagnosed and were present.

Probably more careful questioning would have elicited a history of previous attacks in a greater number of these cases, but at any rate in 18 out of the 42 fatal cases the alimentary tract had caused persistent trouble before the final attack of appendicitis. Three things are learned from these facts: (i) Recurring "medical" appendicitis should be treated surgically. (ii) Interval appendicectomy must always be done after relief of an appendiceal abscess by drainage. (iii) Unless the patient's condition does not warrant it, appendicectomy should be part of the routine in operating on gastric and duodenal ulcers and gall-bladders.

I have seen fatal appendicitis occur in patients who have previously had an abdominal gynaecological operation performed and, although there is not the same direct aetiological relationship as there is with other alimentary lesions, I think it is wise prophylaxis when the abdomen is opened to examine the appendix and in as many cases as possible to remove it if it is abnormal.

It should never be removed if an extensive pelvic operation with freeing of adhesions and opening up of tissue planes has been done.

TABLE XII.
Provisional Diagnosis in Fatal Cases.

| Condition. | Number. |
|---|---------|
| Acute appendicitis | 30 |
| Acute appendicitis or perforated duodenal ulcer | 1 |
| Acute appendicitis or intestinal obstruction | 1 |
| Acute appendicitis or acute cholecystitis | 1 |
| General peritonitis, ? cause | 4 |
| Intestinal obstruction | 2 |
| Perforated duodenal ulcer | 1 |
| Twisted ovarian cyst | 1 |
| No provisional diagnosis | 1 |
| Total | 42 |

On the patient's admission to hospital diagnosis was doubtful in 12 cases, but in every case the need for urgent surgical attention was recognized. Appendicitis is by far the commonest cause of general peritonitis, and if an exact diagnosis cannot be made in these cases I usually open the abdomen in the right iliac fossa, preferring occasionally to make a second incision rather than to perform a difficult appendicectomy across coils of small intestine.

Expectant or Delayed Treatment.

The technique of the delayed treatment as described by Bailey is as follows:

1. The patient is placed in a high Fowler's position.

2. A two-hourly pulse chart is kept as a routine, and in some cases hourly or half-hourly charts are kept. Temperature is recorded every four hours and a record of vomiting is kept.

3. Water only is allowed for four days. On the fifth day, if the temperature and pulse are satis-

factory and the patient feels hungry, feeding is commenced.

4. All drugs are forbidden. No morphine is given.

5. The bowels are left confined if they are not opened naturally. On the fourth or fifth day a small glycerol enema is given. No purgatives of any kind are given until resolution is complete. The nurse in charge must report immediately: (i) a rising pulse rate, (ii) vomiting, (iii) pain, (iv) diarrhoea or the passage of mucus in the stools.

The delayed methods of treatment recommended by Love and others are claiming adherents in many parts of the world and have given excellent results in the hands of individual surgeons.

I have used the method many times in the last two years and have been very impressed by the way the infection settles down under a *régime* of complete alimentary rest.

This is not a return to the medical treatment of appendicitis, which has rightly been abandoned. It is not in fact a treatment for appendicitis at all, but for the peritonitis that results from failure to recognize and treat appendicitis.

The only treatment for appendicitis is and always will be immediate operation, and the Ochsner-Sherren type of treatment is to be considered only after the time for easy, safe appendicectomy has passed. It is not a new treatment, as it was introduced by Ochsner in 1902 and has been used practically ever since by many surgeons of world-wide repute like Sherren and Deaver.

It is not an easy treatment and requires the constant personal supervision of the surgeon in charge of the case, and, as Bailey has said, it must be carried out on the very threshold of the operating theatre.

The real mortality in appendicitis results from the cases with general peritonitis, and many advocates of the delayed method state that these cases must not be delayed. Sworn and Fitzgibbon delay operation only when there is a palpable mass and when no diffuse peritonitis is present.

Bailey and Love advise immediate operation for diffuse peritonitis unless the patient is nearly moribund, when delay gives him his only chance. Beatson, in 1912, looked on diffuse peritonitis as the only indication for immediate operation.

It is fair to add that Sherren, Deaver, Pomroy and others recommend a trial of delayed treatment in all cases once they have passed the safe limit for early operation, which varies with different writers from twenty-four to fifty hours, or on the disappearance of cutaneous hyperesthesia; they do not exclude diffuse peritonitis.

In Love's series 32% of the patients required urgent operation after a trial of delayed treatment.

Le Grand Guerry delays operation only in cases with diffuse peritonitis and claims a vast improvement in his results when the diffuse peritonitis is allowed to become localized before operation.

Immediate operation is usually advised in the extremes of life, and always on the first day and often on the second day of the attack.

In my series of 42 deaths 19 patients had diffuse peritonitis, and of the others six were over sixty years of age, two were under ten, one was operated on on the first day of the attack, and three were operated on on the second day of the attack.

Many advocates of the delayed method would have operated on all or nearly all of these 31 patients, so that in a series of 1,069 patients it would seem that the delayed method would only have been applied to 11 of the fatal cases.

I do not think it would have improved the mortality, and our complication rate of 5.7% compares favourably with Love's 6.7% complication rate for cases treated by the delayed method.

The time factor in obstructive appendicitis is so variable that any method of selection of cases for delayed treatment based on this factor must be wrong.

In one case the appendix is gangrenous and ruptures within a few hours of the onset, and in another on the third and fourth days the obstructed appendix is still unruptured, yet we read in papers on the delayed method that in the first twenty-four hours all patients should be operated on and that after that all operations should be delayed unless cutaneous hyperesthesia is still present.

Personally I have never found cutaneous hyperesthesia of any diagnostic value, and its presence or absence in my experience has no relation to the condition of the appendix.

While I know that the delayed method for selected cases gives excellent results in the hands of individual surgeons, I feel that its general adoption would be a tragedy.

In 1925 Grey Turner summed up the position when he said:

I have watched the progress of the surgery of appendicitis in the district where I live for over a quarter of a century and during this time I have been witness to the results of the recurring advocacy of the delayed operation. Every time this plan has been written about in the medical press and generally discussed, it has almost at once been followed by an increased mortality.

Management of Acute Appendicitis.

I believe that the treatment for acute appendicitis should be operation in nearly all cases. Operation in all cases gives results directly proportional to the skill, care and individual attention of the surgeon, and in a case with a ruptured appendix is often very difficult to do well.

Realizing how effectively the peritoneal cavity can care for itself, our aim must be to remove the appendix with a minimum of interference. An incision far out in the right iliac fossa, giving a lateral approach to the appendix, should always be used and must be adequate to permit of a visual and not a purely tactile operation. On opening the peritoneum, small bowel or omentum, if either presents, is gently packed medially with a light gauze pack and the caecum is turned up and in to discover the

base of the appendix, which is nearly always least affected. The base is clamped and the clamp is used to deliver the appendix if it can be seen and will come easily. When the caecum obscures the view, the base of the appendix is tied and divided and the caecum is packed out of the field, a very clear view of the situation being given. With gentle coaxing the most friable and rotten appendix can be removed intact, and when this is done under vision there is no risk of spreading the infection by the inadvertent opening of an unsuspected collection of pus.

The bed of the appendix can be inspected and escaped faecoliths can be picked out and thrombosed omentum excised.

Finally, if haemostasis is satisfactory, the wound is closed. Often the last few inches of ileum are the only small bowel seen throughout the operation, and at the worst one or two wayward loops have to be held back with light packs. For all cases my practice is to crush and ligate the appendix before division. A purse-string is unnecessary and takes time, and pricking of a small vessel may be followed by a haematoma in the wall of the caecum.

I find that I am using drainage less and less, and when the appendix has been removed I insert a tube only if there is an abscess cavity, if necrotic tissue or possibly a faecolith is left behind, or if persistent oozing of blood is taking place from raw surfaces. The tube is placed down to the bed of the appendix from the lateral side and never into the free peritoneal cavity amongst coils of small intestine; it is always removed in twenty-four to forty-eight hours. Sometimes I drain the layers of the abdominal wall after the peritoneum has been closed. Done in this way, the removal of the appendix, even if ruptured, does not increase the toxæmia or ileus, and after operation a strict enforcement of the principle of alimentary rest is just as effective in controlling the peritonitis as it is as a pre-operative measure. In early cases any method of appendicectomy and after-treatment will be followed by recovery in the majority of cases, but in the dangerous period, from the third to the fifth day, mortality is directly proportional to the skill of the surgeon and the efficiency of his after-treatment in controlling peritonitis and ileus.

After the operation the patient is placed in Fowler's position and starved.

In the worst cases not even water is allowed by mouth, but for the average case sips of water are very comforting and do no harm.

Saline and glucose solution is administered *per rectum* by the Murphy drip method and subfascially into the outer side of the thighs, and many pints can be given in twenty-four hours. If vomiting is troublesome, a Rehfuss tube is passed and the stomach is washed out, and the tube can be left in place and the stomach contents aspirated frequently as required. Even for complete paralytic ileus, vomiting can be controlled by the indwelling Rehfuss tube, and I have never had occasion to perform an enterostomy for post-appendiceal ileus.

Morphine should be given freely for pain, as pain and restlessness interfere much more with recovery than the theoretical peristaltic paralysis induced by morphine.

In severe cases 4,000 to 8,000 units of gas gangrene antiserum are given intramuscularly immediately after operation and repeated daily until the bowels are opened. In any case it is used if distension and vomiting arise.

It is difficult to obtain proof of the value of this serum, but I have a strong clinical impression that the patients to whom it is given do better than those without it. Stimulating bowel treatment is to be avoided, and if abdominal discomfort develops, an enema gives relief with the passage of flatus and a rectal tube, or the nozzle of an enema syringe may be left in place for some time.

Pituitrin or "Pitressin" is valuable when the bowel is recovering its tone; eserine I have not used for some years. Never order an aperient until the passage of flatus proves that the bowel muscle is capable of peristalsis. If the stomach is kept empty by frequent siphonage, and if dehydration is prevented by continuous administration of saline solution *per rectum* and into the thighs, and if the bowel is left alone, it will usually recover its tone in a few days and recovery will ensue.

In desperate cases of ileus an enterostomy is the last resort, and I have never done it for appendicitis. I find it very hard to know when to do it. In a number of cases in which I have considered it and in which I have delayed, the patients have recovered and one or two have died. Had I done it in all I would no doubt have been enthusiastic about it, but my patients recovered without it.

Twice when I have considered it and a spinal anaesthetic has been administered the spontaneous passage of flatus has rendered it unnecessary; and splanchnic paralysis by spinal injection of "Novocain" is recommended by some for the treatment of ileus.

Newton reports eleven enterostomies with two recoveries, and Love twelve jejunostomies with three recoveries. All were desperate cases.

The almost moribund patient with advanced diffuse peritonitis will probably die if he is operated on, and at least some hours should be spent in expectant treatment before operation is considered. His condition is partly due to dehydration and loss of salt from the blood stream, and partly to the overwhelming absorption of toxins from the alimentary canal and the peritoneum, and partly to the effects of distension of his bowel. Many theories have been advanced to explain this toxæmia, and none is entirely satisfactory, but it appears that the lethal toxins are mostly elaborated in the lumen of the paralysed bowel. The patient should be placed in Fowler's position and glucose and saline solution should be administered *per rectum* and into the thighs. Gastric lavage with the Rehfuss tube should be instituted to control vomiting and to remove toxins that have drained back into the stomach, and, properly managed, it appears to be just as

valuable as high jejunostomy. Gas gangrene anti-serum should be given intravenously in doses of 8,000 to 16,000 units. Heat should be applied to the abdomen and morphine administered. Some patients will not improve, and they will surely die with or without operation. Some will improve, and I believe it is better to continue expectant treatment in these cases unless there is a definite indication for operation.

If the Rehfuss tube is not tolerated, a high jejunostomy should be performed under local anaesthesia, and if there is a large amount of free peritoneal fluid, insertion of a tube into the peritoneal cavity to release tension may help. In these desperate cases the appendices have usually been ruptured for some days and the appendix has ceased to be of prime importance in the condition; time should not be wasted in its removal. The bad reputation of simple drainage in general peritonitis is due to the desperate nature of the cases for which it is reserved.

If there is a definite mass in the right iliac fossa and the patient from the third day onwards appears to be localizing his infection, I would advise delaying operation until a definite abscess is formed or until the mass resolves. If possible, an abscess should be drained *per rectum* or *per vaginam*, as advised so strongly by Barnard, and if the abscess is too high for this it is sometimes possible to approach it extraperitoneally in the right iliac fossa.

If the peritoneum has to be opened, it is packed off and the abscess is gently opened and sucked dry with the pump. The appendix should be removed only if it can be easily done. An abscess cavity should always be drained.

Any patient sent out of hospital with the appendix not removed must return in three to six months for appendicectomy or will sooner or later have a dangerous recurrence. It is surprising three months after an abscess has been drained to find the abdomen practically free of adhesions and the appendix often nearly normal.

In conclusion, I should like to stress again the significant causes of the present death rate. Chief of these is delay, and for this the patient and the medical profession must share the responsibility. Diagnosis should be possible within twelve hours of onset, and with modern methods of communication and transport there are very few patients who could not be operated on within this time or at least within twenty-four hours, when the mortality is less than 1%. This is the ideal that we as a profession must strive for, but, with human nature as it is, many patients will "wait and see if it gets better", pinning their faith to the clinical thermometer and castor oil.

In Philadelphia since 1930 a campaign of public instruction in the facts of appendicitis has been carried out with typical American thoroughness and with a definite reduction of mortality. The outstanding results of this campaign have been a marked increase in the number of cases, earlier admission to hospital, fewer cases with peritonitis,

improvement in the management of cases of spreading peritonitis by the surgeons, and less frequent administration of laxatives. In contrast to this, Truesdell states that in 1930 the mortality amongst doctors in America was 25 per 100,000, whereas amongst the general population it was 18 per 100,000, and I feel that little real improvement will be effected by public instruction.

The high proportion of atypical cases amongst those who die should be remembered, and we should be especially on the look-out for pelvic appendicitis and appendicitis in the aged.

If diagnosis is in doubt, the patient should be placed in Fowler's position and starved and seen again in two hours. If there is still doubt after twelve hours, the opinion of someone who is constantly seeing these patients should be obtained.

In late cases the technique of the surgeon will frequently decide the patient's fate. Interference with abdominal contents must be minimal and, above all, small intestine must not be handled. Paralytic ileus is largely the result of bad technique and can be produced in the normal abdomen. In the presence of peritonitis it is infinitely more likely to arise.

I believe drainage is not often required and, if it is considered necessary, its usefulness ceases after forty-eight hours. The long-continued retention of drainage material is never justified and definitely increases complications.

Small incisions, blind operating, unnecessary packing, rough handling of small intestine and careless haemostasis are the fatal errors of technique.

The full régime of expectant treatment should be employed after the appendix has been removed.

In conclusion, never order an aperient for a patient with acute abdominal pain unless it is certain that appendicitis is not present.

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TRICHOMONAS VAGINALIS IN RELATION TO LEUCORRHEA.

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THE incidence of vaginitis associated with *Trichomonas vaginalis* is apparently quite high in America and Europe, and cases have been reported in this country (Jacobs⁽¹⁾), but it has received comparatively little attention in English literature. This communication is offered in order to draw closer attention to this condition, to give a résumé of current views and to submit a short survey indicating the incidence of infection in this community.

The survey covered all new patients coming to the outdoor department complaining of leucorrhœa. During the period of survey 46 patients were examined, 30% of whom were found to have trichomonads in the vagina.

Zoology and Morphology.

In 1837, in his studies "on the nature of mucus", Donne described the flagellate known as *Trichomonas vaginalis*. Towards the end of the nineteenth century attention was drawn to its frequent occurrence in vaginal discharge. It was considered to be a harmless incidental saprophyte and received little more than passing attention. In the last decade, however, a considerable amount of work, both clinical and experimental, has been done, and tricho-

monads are now seriously being considered as a cause of a specific form of vaginitis.

Trichomonads are unicellular animals belonging to the flagellata. There is a large number of parasitic species widely distributed, both zoologically and geographically. Hegner and Ratcliffe⁽²⁾⁽³⁾ have described species isolated from opossums, cats, prairie dogs, monkeys and chimpanzees. Species living on man have been described in all parts of the world. They have been isolated from the mouth, intestines, nose and air passages, vagina, bladder and prostate.

These species found in man are often given separate names, such as *Trichomonas hominis*, *Trichomonas buccalis*, *Trichomonas intestinalis* or *Trichomonas vaginalis*. Some doubt exists whether they are really distinct species or whether they are members of the same species found in different situations, but host specificity has been established.

Trichomonas vaginalis (Donne), the organism found in some cases of leucorrhœa, is piriform, but, being actively motile, varies greatly in shape. It is variable in size, being from 18 to 26 microns long and from 6 to 18 microns wide (Hegner). It has four flagella attached to one point on its rounded end. There is an undulating membrane commencing at the rounded end and extending half or three-quarters of the way down one side towards the pointed end, which terminates in a non-motile axostyle. It is assumed to reproduce by binary fission only. As yet no cyst or resting stage has been found. The full life history has not yet been discovered, and so questions as to how the vagina becomes infected or how the parasite is transmitted from host to host are still unanswered.

Pathogenicity.

Although trichomonads have been found associated with various diseases in man, for example in the stools of dysenteric children, in pyorrhœal pus, in the nasal secretion during an attack of coryza, or in leucorrhœal discharge, yet their pathogenicity has not been satisfactorily proved. Many consider them harmless saprophytes and point out that bacteria are always present in these conditions at the same time. The bacteria present are not always of the same species and often are of species not commonly accepted as pathogenic. Indeed it is impossible to find these areas free of bacteria. Moreover, trichomonads apparently feed on bacteria. They cannot live in culture unless bacteria are present (Hesseltine⁽⁴⁾). Further, trichomonads have been found in these situations during apparent health; but then so also have the bacteria.

With regard to vaginitis, some take the Daedalian attitude that normally the organisms are harmless, but when some other factor—a bacterial infection for example, or possibly trauma—enables the trichomonads to become associated with an inflammation, they can then so alter and aggravate the condition as to cause symptoms. However, there is a large and growing body of opinion that a vaginitis is caused by *Trichomonas vaginalis*. With regard to

this point some experiments by Hegner are interesting. He cultured trichomonads from the intestine of *Macacus rhesus* and was able to infect the vaginae of other monkeys with these organisms. He then cultured trichomonads from infected vaginae and was able to infect further healthy vaginae. During these experiments he found some monkeys to be resistant to infection. His experiment was designed to study the possible intestinal origin of trichomonads found in the vagina.

Clinical Condition.

A sufficient number of cases have been observed and reported to establish a complete and characteristic clinical entity. Even if it is wrong to assign the main aetiological rôle to the *Trichomonas vaginalis*, yet it is established that in these cases of vaginitis where these organisms are found they are present in large numbers, and the clinical condition does not clear up until they cease to inhabit the vagina. Varying grades of severity are found and the signs and symptoms vary accordingly. Patients with a mild vaginitis complain of leucorrhœa only. Those more severely affected complain of a pelvic discomfort which is difficult for them to describe. Sometimes dyspareunia and dysuria are present. Excoriation of the vulva and thighs from the irritating discharge often cause the patient much discomfort. The discharge has a peculiar disagreeable odour which is noticeable to the physician and the patient. It is greyish or creamy yellow, according to the amount of blood present. It is strongly acid to litmus. When seen in the vagina through the speculum it is often bubbly and is noticeably free from mucus. The *labia minora* are often inflamed and may have small ulcers. The *carnunculae myrtiformes* are particularly liable to be affected. They become red, swollen and even more tender than other parts. Examination with a suitable speculum and light so that the vaginal walls can be properly inspected will show that they are redder than normal, and they may have numerous small bright red tender spots which bleed easily when swabbed. The cervix often shows varying degrees of "erosion". This may be of the concentric type where the erosion is surrounding the external os. More often the patches of erosion are scattered over the vaginal portion of the cervix away from the external os. Kleegman⁽⁵⁾ gives some good illustrations of this eccentric type of cervical erosion.

It should not be forgotten that a vaginitis associated with *Trichomonas vaginalis* may complicate some other gynaecological condition. This is a factor which was noticed in our series, but which does not seem to be stressed by others.

Incidence.

The disease is very rare before puberty, but a few cases have been reported (Frankenthal and Kobek⁽⁶⁾). Of leucorrhœa in virgins trichomonads are a frequent cause. The disease also occurs after the menopause. Davis and Colwell⁽⁷⁾ quote a number of German and American workers who give

figures showing the percentage of cases of leucorrhœa due to *Trichomonas vaginalis*. These figures range from 28% to 68%. Northrup⁽⁸⁾ found trichomonas in 42 out of 180 patients in his private practice, Ewing and Le Moine⁽⁹⁾ in 66% of 90 cases.

In order to see if the condition was at all common in this community, every new patient presenting herself at the outdoor department of this hospital and complaining of leucorrhœa was examined for the presence of trichomonads. A series of 54 consecutive unselected cases was thus obtained. Eight of these patients were children. It was found that of the 46 cases of leucorrhœa in mature females 14 harboured trichomonads. In 9 of these 14 cases vaginitis due to *Trichomonas vaginalis* was the only diagnosis arrived at after a careful bacteriological and physical examination. In the other five cases vaginitis was present and was considered to be due to trichomonas, but there was in addition some other gynaecological condition. One patient had a retroversion with pelvic adhesions following a septic abortion. Two had mild salpingitis. Two had acute gonorrhœa. In these last two the appearance of the vagina corresponded with that found in trichomonas vaginitis and not to the granular vaginitis found when the gonococcus attacks the vaginal walls.

This series covers only a small number of cases, too small for the figures obtained to carry much weight alone. Yet it is submitted that when compared with figures already published in other parts of the world, they indicate that the degree of infestation in this community is not slight.

The figures of incidence given by different authors vary widely. This variation may be due to difference in the social status of the groups examined, or possibly due to erroneous observation owing to the difficulty of microscopic recognition of the organisms. This difficulty is admirably demonstrated by a series of examinations made by Ewing and Le Moine.⁽⁹⁾ They made fresh wet preparations and stained preparations from each of 90 patients. Of the 90 stained preparations, 66% showed trichomonads and 34% did not. Of the 90 wet preparations, 41% showed trichomonads, 51% did not, and 8% were not examined.

Diagnosis.

The diagnosis usually has to be made from acute gonorrhœa, for in both these diseases the discharge and often the history are somewhat similar. Several of our patients first noticed the discharge soon after an isolated coitus. In this type of case serological and cultural tests as well as the routine smears should be made before excluding gonorrhœa. Jacobs states that trichomonas "is apparently never present at the same time as the gonococcus". This is contrary to our experience. In both our cases in which trichomonads and gonococci were present at the same time, the identity of the gonococcus was established not only by smears, but also by its cultural characteristics and "sugar" reactions. Kleegman⁽⁵⁾ also had a case showing both infections at the same time in one of her series.

The diagnosis of vaginitis associated with *Trichomonas vaginalis* is made from the nature of the discharge, the appearance of the vagina, and by the microscopic demonstration of the organism. The discharge is typically a malodorous, pussy yellow or greyish fluid. It does not contain mucus. If mucus is present, then there is a concomitant cervicitis. A purely mucous discharge is extremely unlikely to be from a vaginitis associated with trichomonads; such a discharge comes from the cervix or uterus.

The appearance of the vagina is important and is apt to be overlooked if a routine examination is made in such a way that the vagina is not deliberately inspected. Some specula, while giving an excellent view of the cervix, do not permit an adequate inspection of the vagina. A speculum with fenestrated blades or blades which separate, exposing the vaginal walls, is to be preferred. Moreover, such a speculum is essential for treatment.

Examination of the Discharge.

Material for microscopic examination collected from the cul-de-sac of the posterior fornix will generally be found to contain the greatest numbers of trichomonads when they are present. Some discharge from there can be collected in a platinum loop and mixed with a drop of physiological saline solution on a warmed slide and immediately examined under the high power dry lens of the microscope. When there is apt to be a few minutes' delay between collection and examination of the material, such as might occur when one wishes to complete the pelvic examination before using the microscope, or when the material has to be carried from the examination room to the microscopy room, then the following technique has been found convenient. A sterilized glass tube of fairly narrow bore is fitted with a rubber teat. (An old graduated one or two cubic centimetre pipette which has had its tip blunted and smoothed off in the flame serves well.) With this some warm saline solution is run into the upper part of the vagina. By sucking and blowing the saline solution is mixed with the discharge and then the mixture is transferred to a sterile test tube. The test tube is placed in a water bath or other vessel containing water at 37° C. When kept at 37° C. we have found trichomonads in material collected by this method to remain active for two or three hours. This method can be used without a speculum if desired, for example, when examining young adolescents or children.

A drop of the purulent mixture is placed on a warm slide and examined under a coverslip with the high power dry lens. The trichomonads are recognized by their active movements as they swim about or burrow their way into clumps of pus and epithelial cells. They may remain active for fifteen or twenty minutes or more at room temperature in the summer time, but in winter their movements cease within a very few minutes. Provided they have not been cold too long, they can be made to resume their activity by warming the preparation. The actual flagella and undulating membrane can-

not be seen at first, but if an individual organism is watched as the preparation becomes cold, the movements become slower and slower and the flagella and undulating membrane can then be seen easily. As movements cease and the organism dies it assumes a spherical shape and the flagella become folded round the body of the organism. In this state it cannot be distinguished from a pus cell or small epithelial cell. It is this difficulty or impossibility of recognizing the cell in its immobile or dead state which makes it so important to have the organism in an active state when a wet film is examined. Also, when preparations for staining are made, the organisms must be killed very quickly from an active state so that they become fixed in an "open pose" before they have time to assume the folded spherical shape. Films must be spread very thinly so that they dry quickly. We have found that films made of material collected from the posterior fornix on a swab stick, such as used for swabbing throats, and smeared thinly on specially clean slides are quite satisfactory. Films made with a platinum loop are not nearly so good. Some of the saline-discharge mixture used for wet films makes good slides for staining, provided a sufficiently thin film is made to allow of rapid drying.

For studying the organism or for acquiring familiarity with its morphology, we have found Heidenhain's iron haematoxylin method of staining protozoa⁽¹⁰⁾ and R. Muir's⁽¹¹⁾ modification of Pitfield's method for staining flagella very useful (Figure I). For routine purposes, following the

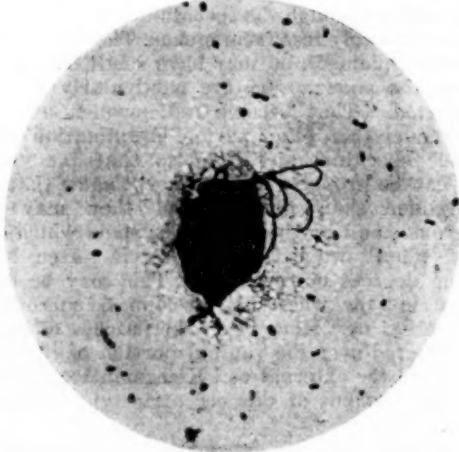


FIGURE I.
Microphotograph of *Trichomonas vaginalis* stained by Muir's modification of Pitfield's staining for flagella. The four flagella are seen attached to the top and curling to the right. On the left-hand edge the profile of the undulating membrane can be made out. The axostyle at the lower end of the organism is a little blurred by adhering débris. The black dots scattered about the field are bacteria.

recommendation of Ewing and Le Moine,⁽¹⁰⁾ simple staining with dilute carbol fuchsin (Ziehl's carbol fuchsin solution one part, distilled water fifteen parts) for two minutes is used. They recommend staining the air-dried films without flaming, but we

have found no objection so far to the use of gentle heat for fixing (Figure II).

When stained by this method, the body of the trichomonad is seen to contain clear unstained "vacuoles". Sometimes there are only a few "vacuoles", sometimes there are many, so that the protoplasm looks foamy. The nucleus stains slightly darker than the rest. The flagella, which are the main feature for identification purposes, stain quite well. They are fine and slender and need careful focusing. Ingested bacteria are also shown up by this stain. A greater or less distortion of shape is usually present as a result of the smearing in making the film. A similar appearance is seen in Gram-stained films when weak carbol fuchsin is used as the counterstain. The trichomonads are Gram-negative.

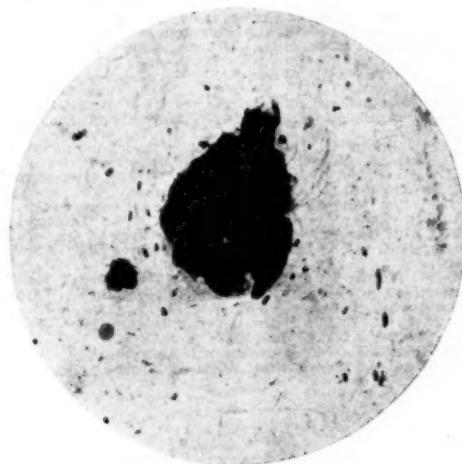


FIGURE II.

Microphotograph of *Trichomonas vaginalis* stained with weak carbol fuchsin. The flagella are seen attached to the right-hand edge of the trichomonad about the middle. The flagella are much more faintly stained by carbol fuchsin than by Fitfield's staining. In the photograph the body of the organism appears darker than it does in actual practice. The "vacuoles" are not prominent in this particular specimen.

Treatment.

The organism *Trichomonas vaginalis* is very easily killed by antiseptics. The whole difficulty of treatment appears to be to get at them in the folds and crevices of the vagina. The vagina must be stretched and its walls smoothed out when antiseptics are applied to it. The use of an antiseptic with a low surface tension, such as hexyl-resorcinol solution, "ST 37" (B.D.H.), as recommended by Jacobs, helps in overcoming the difficulty. A great many methods and a greater number of antiseptics have been recommended for treatment. All are apparently effective, some more rapidly than others. The underlying principles of treatment are to apply antiseptics to the vagina, to apply them to every part of the vagina and to apply them continuously until the condition has cleared up. Antiseptics may be applied as solutions, powders, pastes or pessaries.

The vagina should be stretched by the speculum and thoroughly cleansed with a soap or lysol solution. It should then be dried and painted with the antiseptic chosen. For this purpose dyes, such as mercurochrome, Bonney's blue, acriflavine *et cetera*, are useful in that one can see by the staining if any parts have escaped attention. The continuous action of an antiseptic can next be insured by tampons or strips of gauze soaked in antiseptic and left in the vagina till the patient's next visit. Tampons were originally designed for treating the cervix and they keep the antiseptic in the upper part of the vagina. In vaginitis associated with trichomonas, the lower part of the vagina, particularly the *carnunculae myrtiformes*, should also receive the benefit of the antiseptic, and we have found strips of wide bandage 15.0 or 20.0 centimetres (six or eight inches) long, covered with ointment, better than tampons. If the bandage is lightly packed in, it does not cause the patient any discomfort. We have found Lassar's paste, as recommended by Kleegman, quite effective. Treatment should be carried out daily at first and then three times a week.

There are alternative forms of treatment worthy of mention. Drying is injurious to the trichomonads, so some authors pack the vagina with kaolin to which some antiseptic powder has been added. Flowers of sulphur has also been recommended. Gellhorn⁽¹²⁾ uses a special vaginal insufflator whereby he obtains maximal uniform distension of the vagina by air pressure; at the same time an antiseptic powder is blown over the vaginal walls. He uses a powder containing "Acetarsone". Intelligent patients might be entrusted to use this form of treatment themselves. Goodall⁽¹³⁾ claims very excellent results with a gelatine pessary containing, among other things, 1% picric acid, which the patient uses herself. Foaming antiseptic tablets, of which there are several brands on the market, seem a very rational form of treatment and one which the patient can conduct herself. In a few cases in which we have used these tablets the results are sufficiently promising to warrant further trial. A sufficient number of cases have not yet been treated for definite conclusions to be drawn; nor have we yet found published records of this form of treatment. Of these tablets "Spuman" offer a fairly wide range of antiseptics in two sizes. The expense of any of these tablets is not in their favour, particularly for hospital practice. The normal vaginal secretion is acid and is inhabited by Döderlein's bacillus (Cruickshank and Sharman⁽¹⁴⁾). Treatment by antiseptics kills Döderlein's bacillus as well as other organisms. So to help reestablish normal conditions after active treatment has ceased, lactic acid douches (0.5%) or pessaries are useful. Mohler and Brown⁽¹⁵⁾ have had promising results in treating vaginitis (not necessarily trichomonas vaginitis) with live culture of Döderlein's bacillus made into a paste with lactose.

If the patient cannot be trusted to sterilize the douche apparatus, it is probably better not to let

her use one; she will only infect or reinfect her vagina, which at the end of treatment is probably in a lowered state of resistance from the antiseptics.

Treatment should be continued during menstruation because trichomonads are always found in greater numbers immediately after the menstrual flow. Stein and Cope⁽¹⁶⁾ suggest that the reason for this increase in numbers may be that a sex hormone liberated at that time favours the growth of the trichomonads, because they obtained better growth of the organism in cultures when they added to the medium 4% "Progynon" (a hormone manufactured by Schering).

Prognosis.

The condition usually clears up after a few treatments. Some cases clear up more rapidly than others. Those in which gynaecological complications are present seem to take longer. The treatment must be carried out until no more trichomonads are found on examination. Progress examinations should be made after the first two menstrual periods as well. There should be no treatment or douching for at least forty-eight hours before an examination.

Should trichomonads be found at any of these tests, active treatment should be instituted immediately before symptoms develop. If these precautions are taken, relapses are unlikely to occur. A subsequent infestation is probably a fresh one and not a relapse.

During these progress tests it was found that many women still had a discharge, sometimes only visible with the speculum. Yet no trichomonads could be found and the discharge was "dry" and crumbly and caseous, and not the fluid purulent discharge of a vaginitis. Moreover, when the discharge was swabbed away the vaginal walls appeared healthy. On microscopic examination it was found that the discharge consisted mainly of epithelial cells and large numbers of a Gram-positive bacillus. This discharge always cleared up after three or four weeks without treatment. One case, in which 10% mercurochrome was used, took much longer. The conclusion was arrived at that the condition was due to chemical irritation. Although using it for another purpose, Stratham⁽¹⁷⁾ draws attention to the disadvantage of using mercurochrome in solutions stronger than 1% or 2% to paint the vagina at short intervals. Possibly the 5% mercurochrome and Lassar's paste treatment that we used was unnecessarily strong.

Summary.

1. A brief description of *Trichomonas vaginalis* is given and its relation to a specific form of vaginitis is indicated.

2. A survey of 46 consecutive cases of leucorrhœa in mature females is made, showing 30% to be harbouring trichomonads.

3. Details for microscopic diagnosis are given.

4. Methods of treatment are indicated.

Acknowledgement.

We wish to express our gratitude and appreciation to Dr. Clunies Ross for the excellent photographs which were made for us in his laboratory.

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A SPACED RADIUM NEEDLE.

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Perth, Western Australia.

THE radium needles in common use for the treatment of carcinoma of the breast have two disadvantages. In the first place, the half millimetre of platinum infiltration so commonly employed is inadequate; and secondly, there is a marked diminution of intensity toward the ends of the needle.

In order to overcome these disadvantages, the needle illustrated in Figure I has been devised. Instead of distributing the radium evenly along the active portion of the needle, it is inserted in small containers with intervening spacers, and a greater amount of radium is placed at the ends than at the centre. The intention is to increase the intensity of irradiation at the ends of the needle and to decrease the intensity at the centre. The needle illustrated has an overall length of about six centimetres with an active length of 4.9 centimetres. It contains 3.1 milligrammes of radium element, and the filtration is by 0.8 millimetre of platinum.

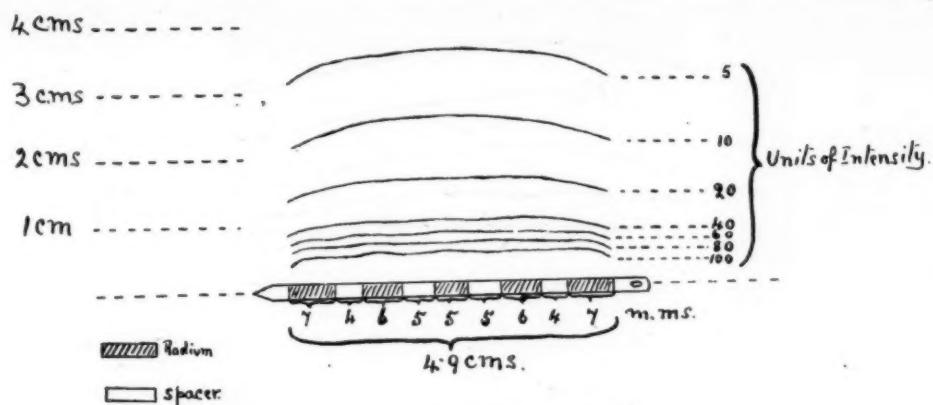
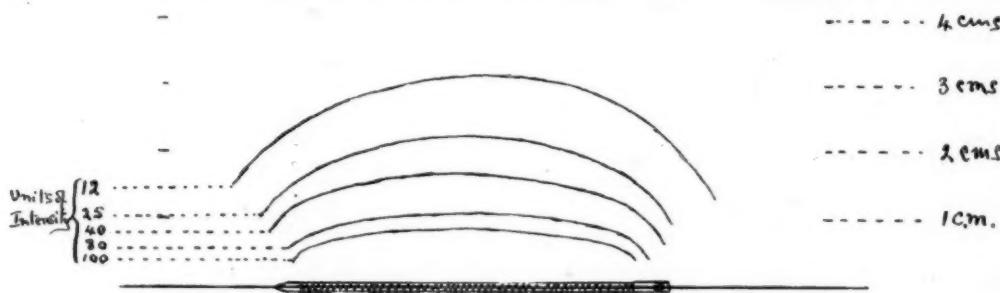
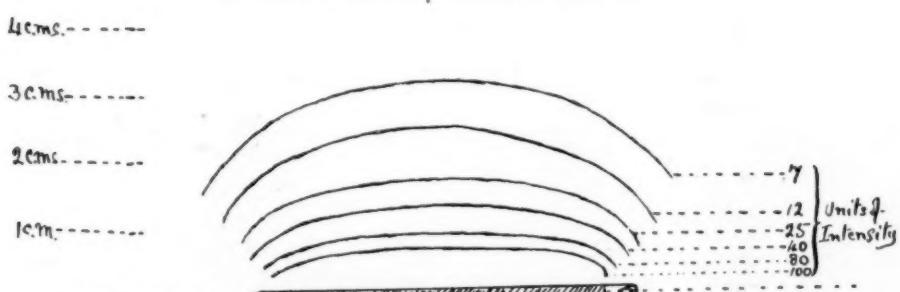


FIGURE I.
Spaced needle containing 3.1 milligrammes of radium element and 0.8 millimetre platinum filter. The shaded portions correspond to the radium-containing sections and the blank spaces to the spacers. The radium in its containers is distributed one milligramme per centimetre.



5.0 c.m.s. Active length.
5.0 m.g.s. Radium Element.
0.5 m.m. Platinum filter

FIGURE II.
Radium needle, five centimetres active length, containing three milligrammes of radium element, filtered through 0.5 millimetre of platinum.



5.0 c.m.s. Active length.
3.0 m.g.s. Radium Element.
0.5 m.m. Platinum filter

FIGURE III.
Radium needle, five centimetres active length, containing five milligrammes of radium element and filtered through 0.5 millimetre of platinum.

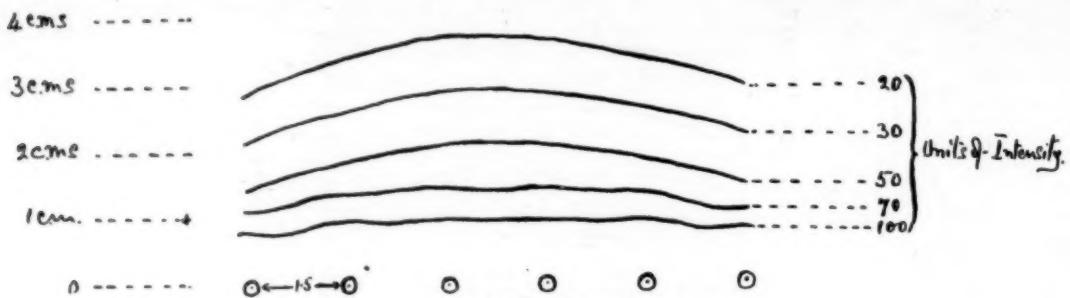
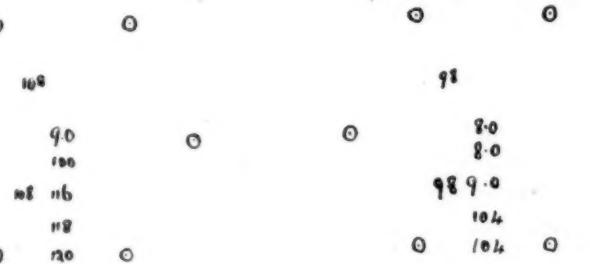


FIGURE IV.

Iso-intensity lines around the centre of six needles arranged parallel to each other 1.5 centimetres apart.

The amount of radium incorporated is possibly not ideal for the filtration used. Four milligrammes of radium distributed in the same manner over a

Throughout the accompanying diagrams the unit of intensity employed is such that 100 units maintained for a period of five hours will produce an



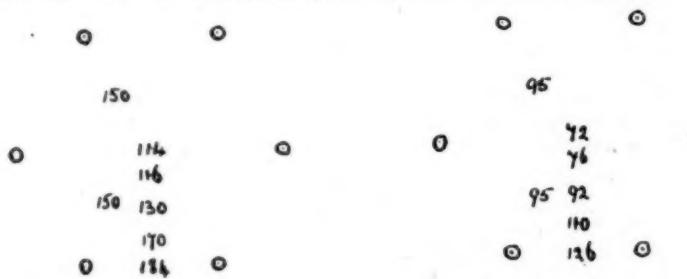
Section through central plane. Section 5mm from one end.

FIGURE V.

Sections through an arrangement of six needles showing the distribution of intensities: (a) central plane, (b) plane five millimetres from one end. Needles two centimetres apart on the circumference of a circle four centimetres in diameter. Each needle, as in Figure I, 4.9 centimetres active length, 3.1 milligrammes of radium, with 0.8 millimetre platinum filter.

length of five centimetres would give a 20% reduction of the time necessary to deliver a specified dose

amount of irradiation equivalent to one "D" unit (equal to 68 international r units).



Section through centre.

Section 5m.m. from one end.

FIGURE VI.

An arrangement the same as in Figure V. Each needle, as in Figure II, five centimetres active length, three milligrammes of radium, 0.5 millimetre platinum filter.

to the tissues. This would bring more cases within the seven-day period, which is so convenient for hospital management.

The improved distribution may be judged by comparing Figures I and II. Figure I shows that at a distance of 7.5 millimetres from the spaced needle

the intensity is the same at the centre as it is three millimetres from the end of the needle, whereas in

similar combination of the needles in common use at the present time.

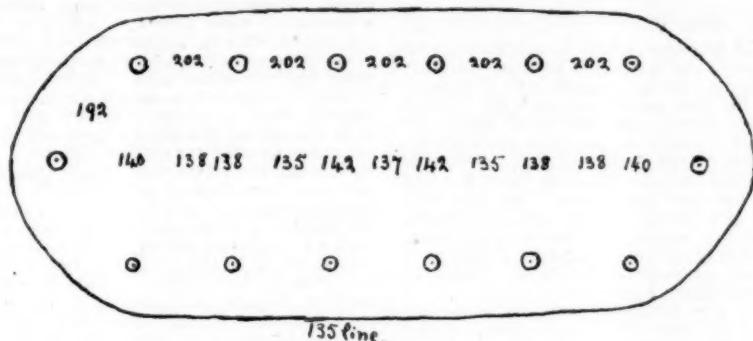


FIGURE VII.

Showing the distribution of intensities around an arrangement of two series of needles at intervals of 1.5 centimetres in planes 3.0 centimetres apart, with an additional needle at each end. Each needle is similar to that shown in Figure I.

Figure II there is a 25% loss at the same distance from the end of the needle.

Figure IV shows the lines of iso-intensity surrounding a series of six spaced needles placed parallel to each other at intervals of 1.5 centimetres.

The improved distribution is well demonstrated by a consideration of the intensities surrounding a group of needles. A simple example is the arrangement of six needles parallel to each other at equidistant points around a cylinder. Figures V and VI illustrate the intensities within such a combination of needles. When the spaced needle is used, the intensity at the centre of a plane five millimetres from the ends of the needle is only 11% less than it is at the centre of the plane through the middle of the cylinder (Figure V). When the usual needle is employed, there is 35% difference in the

Figure VII shows how it is possible to irradiate evenly a large block of tissue without producing any large areas of over-dosage. The needles are arranged in two planes three centimetres apart, with intervals of 1.5 centimetres between the individual needles. Over a block of tissue 10.0 by 4.5 by 4.5 centimetres there is a minimum intensity of 135 units.

One hundred and thirty-five units maintained for seven and a half days will give 48 "D" units, which is equivalent to 3,250 r units or six threshold erythema doses, as defined by Quimby, of the New York Memorial Hospital.

Summary.

A radium needle is illustrated which would give a more even distribution of radiation along its length.

The distribution of radiation produced by groups of such needles is shown, and in one case a comparison is made with the intensities produced by a

The principle involved is a simple one and could with advantage be applied to radium needles of all sizes.

Reports of Cases.

DISORDERS OF THE PITUITARY BODY.

By W. D. CUNNINGHAM, M.B., B.S. (Sydney),
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Newcastle.

Case I.

A GIRL, aged eighteen years, had a history of frontal headaches for four years. She had complained of failing vision for the last twelve months. She had had no previous illnesses. Her menstrual periods were regular; the duration was four to five days and menstruation was of the twenty-one day type. Her periods commenced when she was thirteen years old.

The mother and father, aged fifty-one and fifty-two years respectively, are alive and well. Four brothers, all alive and well, are of normal physique and mentality. The patient's sister, aged twenty-six years, is of similar obese, short physique and dull mentality. The youngest sister, aged seventeen years, is noticed to be becoming more obese and dull mentally.

On examination the patient is an obese young woman of ruddy complexion; she is sleepy, has a dull expression and smooth delicate skin, thus approximating to the Brissaud type of pituitary disorder. Her weight is 126 kilograms (twenty stone). Her height is 152.5 centimetres (five feet one inch). She is mentally backward. Her alimentary, respiratory and cardio-vascular systems are clear.

Special examinations have been carried out. The Wassermann and Kline tests give no reactions. Her blood count is normal. Her basal metabolic rate is +10%. A sugar tolerance test revealed a lowered sugar tolerance curve of the diabetic type. X ray examination revealed nothing abnormal in the pituitary fossa. The fundi are clear. Visual fields are normal.

Comment.

The chief interest in this case lies in:

1. Familial incidence.
2. Lowered sugar tolerance.
3. The normal basal metabolic rate.
4. Normal menstrual periods.

In hypopituitarism due to functional degradation of the chromophobe cells, primary or secondary to adenomatous tumour, there is increased sugar tolerance, low basal metabolic rate and amenorrhoea.

Case II.

A male patient, aged fifty-two years, has a history of increasing deafness during the last three months. He has had tinnitus for ten years. He has complained of breathlessness on exertion for five years and general feeling of weakness for twelve years. He has been unable to walk without the aid of crutches for the last three years. He has had attacks of visual hallucinations of multi-coloured worm-like figures and fortification spectra without headache during the last five years. He has had sexual impotence for five years. At the age of twenty years he noticed that his hands were becoming larger. He has noticed no change in himself during the last five years. He has had no previous illnesses. There is nothing relevant in the family history.

Examination reveals the following skeletal changes: marked overgrowth of the lower and upper jaw, of the malar bones, of the supraorbital margins, of the occipital protuberance, kyphosis, enlargement of the hands and feet. The antero-posterior diameter of the chest is increased, being 110 centimetres (forty-four inches) in diameter. Overgrowth of the olecranon and of the coronoid processes is so marked that the range of flexion is only through 60°; full extension is unobtainable.

The subcutaneous tissues of the hands, feet, nose, scalp and lips are markedly thickened. Deep corrugations are present on palms and scalp. Muscular weakness and hypotonia are present in the arms and most markedly in the legs.

The respiratory, cardio-vascular and alimentary systems are clear. The fundi and fields of vision are normal. The patient has a lowered sugar tolerance curve.

X ray examination reveals definite enlargement of the pituitary fossa; there is no destruction of the clinoid processes. The basal metabolic rate is +7%. The Wassermann and Kline tests have given no reaction. The blood count is normal.

Comment.

The chief interest in this case lies in the presence of hypopituitarism as evidenced by:

1. Excessive skeletal changes being fixed.
2. Diminished sexual activity.
3. Weakness.
4. In attacks of typical fortification spectra of migraine appearing without headache, probably due to hyperaemia of the pituitary body.

The great advances in surgery on pituitary tumours, coupled with early diagnosis, should in the future cause these cases of acromegaly to become rare.

Reviews.

THE NATURE OF THE CANCEROUS PROCESS.

J. P. LOCKHART-MUMMERY has embodied his theory as to the nature of the cancerous process in a work entitled "The Origin of Cancer".¹ Considerable discussion has recently centred around the views that he has put forward, and here we have them set out in full with all the ancillary evidence. Briefly, Lockhart-Mummery maintains that mutations occur from time to time in the genes carried by somatic cells, just as they appear from time to time in the genes of the sex cells. Considering the large number of divisions that many of the cells of the soma undergo and the varying factors to which they

are exposed, it seems inevitable that alterations should occur in the genes in the chromosomes during the course of time. All such alterations in genes must necessarily give rise to alterations in the descendant cells possessing them. Lockhart-Mummery puts forward the view that a change in some gene in a cell may cause such cell and its descendants to proliferate at a greater rate than corresponding cells in which such an alteration in a particular gene has not taken place. If the change in the gene is of such a nature that merely an increased rate of division results, then a simple tumour will form, because the cells possessing the altered gene are multiplying at a rate so much greater than their fellows. Lockhart-Mummery epitomizes his views thus: "A simple tumour results from the gene mutation of somatic cells for increased growth, that is, a greater rate of mitosis than the normal for that tissue; but a malignant tumour results from a gene mutation for increased growth plus some biochemical property which gives it the power of invading other tissues and establishing itself there." This theory is of considerable interest, though perhaps only a few would subscribe to it as being the full and complete explanation of the nature of the cancerous process. There seems no doubt at all that changes in the genes in the somatic cells must occur. All the descendants of such cells would manifest the altered characters resulting from the change in the gene. This possible explanation of alterations in cell behaviour has not previously been considered seriously by pathologists. There is no doubt that it is very stimulating to read a work such as this, and all those who have an interest in cancer should certainly peruse this volume.

One very extraordinary statement is made, as follows: "It has been observed that when a tumour develops in one twin in any particular tissue or organ, the other twin develops a similar tumour in the same tissue or organ at approximately the same time; not only this, but so far no case has been discovered of one homologous twin having a tumour and the other twin failing to have the same tumour also." If this statement is correct, an unusually interesting problem presents itself which must have a very definite bearing on the nature of malignant growths and would show that such must be based in some definite way on hereditary qualities. Whilst admitting that a number of examples of such tumours occurring almost contemporaneously in homologous twins have been recorded, there must surely be a number of examples of malignant growths, perhaps on the lip, or the tongue, or on the skin surfaces, which have appeared in one such twin and not in the other. We are afraid Lockhart-Mummery's statement must be an exaggeration, but we would call on all those interested in the question in the hope that further examples of tumours in homologous twins may be recorded.

We are interested to find that Lockhart-Mummery has recorded an aspect of successful radium treatment to which attention has been called by Cleland in Australia. When a large epitheliomatous ulcer has been treated (Lockhart-Mummery gives an illustration one of the skin of the perineum), "the tumour . . . slowly disappears entirely, leaving perfectly normal tissues behind", and not an open ulcer which becomes covered with normal epithelium from the edge. The healing of the affected area appears to take place at a greater rate than can be explained by the epithelialization spreading over it from the adjacent normal skin. The author suggests that the cancer cells had been made to mutate backwards, their power of reproducing themselves having been destroyed by the action of the rays. It has been suggested that this phenomenon, if confirmed, can be explained either by the treatment causing the malignant cells to become normal again or by the presence amongst the cancerous cells, and entangled in them, of some normal cells, which survive the radium application and then seed the raw surface.

Space will not permit us to discuss in full the views set forth by Lockhart-Mummery, but we can highly recommend his work to medical men in general as well as to those specially interested in the problems of cancer. There are a few misprints, such as Colley for Coley, glycolitic for glycolytic, tryphan blue for trypan blue, *Anothera* for *Enothera*, which, though trifling, are somewhat annoying.

¹ "The Origin of Cancer", by J. P. Lockhart-Mummery. M.A., M.B., B.C., F.R.C.S.; 1934. London: J. and A. Churchill. Demy 8vo, pp. 167, with illustrations. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 29, 1934.

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DEATHS FROM APPENDICITIS.

THE paper by Dr. C. J. Officer Brown published in this issue of the journal is one of more than usual interest. It should appeal to all medical practitioners, whether they be surgeons, physicians or general practitioners. Surgeons are concerned because acute appendicitis is what is known as a surgical condition. The statistics relating to appendicitis in large hospitals are to some extent a reflex of the surgical skill of those who bear the title of surgeon in these hospitals, and surgeons, for this if for no other reason, are naturally anxious to see the mortality from an acute abdominal condition reduced to the lowest possible percentage. The physician is interested because he often has to make the diagnosis. The general practitioner is interested because he has to make the diagnosis of acute appendicitis oftener perhaps than anyone else, because he may wish to perform appendicectomy, and because he is the only type of practitioner who in certain circumstances may not be able to avoid performing this operation. At the Victorian meeting the view was expressed that the recent rise in the mortality from acute appendicitis had occurred

because the operation of appendicectomy was often performed by those whose experience and skill did not warrant their excursions into the field of operative surgery. If we accept this view it is necessary to try to discover how the state of affairs may be remedied.

No one will deny that ability to remove an acutely inflamed appendix in what is known as a difficult case can come only after a certain amount of training and experience. In Australia conditions of medical practice vary with different localities. In country districts long distances often compel medical practitioners to undertake abdominal operations in circumstances that would not be described as the most favourable. Every country practitioner knows that he may be called upon at a moment's notice to operate in a case of gangrenous appendicitis or for such an urgent condition as strangulated hernia. There follows the question as to whether the training in medical schools and hospitals is sufficient to equip the average graduate to meet such emergencies. It must be recognized that no amount of teaching, either before or after graduation, and that no time, however long, spent in watching operations, will qualify a graduate to deal adequately with difficult abdominal conditions. On previous occasions the statement has been made in these pages that every resident medical officer in a metropolitan hospital should, before he goes out into the world of practice, be allowed to perform, under the supervision of seniors, certain types of surgical operation. The handling of instruments, the making of an incision, the tying of ligatures, and suturing the parietal peritoneum and so forth in a well-equipped theatre and under the searching eyes of onlookers will give a man confidence in undertaking a surgical operation later on and will give his sorely stricken patient more chance of recovery than he would otherwise have. If every resident medical officer were allowed to perform operations in this way, it would in certain instances be quite obvious that the new graduate was fitted neither technically nor temperamentally to undertake operations of any kind. The supervising senior would, or should, in these circumstances not hesitate to voice his opinion, and

the graduate concerned would be unwise to undertake practice in a locality where he had no experienced surgeon whom he might call to his aid.

So much for one side of the question. The next aspect to be discussed is what criterion medical practitioners should adopt in deciding to undertake critical operations, when they are not compelled by isolation to do what lies within their power for a patient suffering from an acute abdominal or other critical condition. There is only one criterion and every medical practitioner knows it. Every practitioner faced with a case of acute appendicitis should ask himself the following question: "If this patient were the person who is dearest to me, would I like him to be operated on by a medical practitioner with my experience and my surgical ability?" If he can answer in the affirmative, he can go ahead with a clear conscience. This criterion applies to every class of medical practitioner, whether he be a general practitioner or one practising as a surgeon. Neither an appointment to the surgical staff of a hospital nor the possession of the fellowship of any college of surgeons will of itself give justification for surgical adventure unless the question stated above can be answered with a decided "yes". It is thus obvious that in this matter there is no question of opposing general practitioners to surgeons. A lively (that is a living) conscience is needed in all medical practitioners, and in those who would practise surgery more than in any others. If the view is correct that the rise in the mortality from appendicitis is due to the performance of appendicectomy by unskilled operators, there will be no lessening of the rate until consciences are awoken and responsibilities realized.

Current Comment.

CURIOSITIES IN HUMAN PARASITOLOGY.

THERE are many strange stories in medical literature—weird superstitions, fantastic theories, and queer beliefs—founded sometimes on faulty reasoning, inaccurate observation, or mere hearsay evidence; deliberately fabricated at other times to explain obscure phenomena. As we read these strange stories and smile with the tolerance of superior knowledge, there will come the chastening

thought that in future generations our descendants will smile—we hope as tolerantly—in the contemplation of many of the beliefs that are cherished now by us.

Some of the most curious stories of the past and present concern human parasitology. Medicine men, witch doctors, and charlatans have always been gifted with the knack of being able to conjure some kind of loathsome creature, at a convenient time, from the bodies of sick people. No doubt it is partly from this charlatanry that many of these stories have directly or indirectly arisen. In a recent issue of *The Chinese Medical Journal*¹ there appears a paper by R. Hoeppli, entitled "Curiosities in Human Parasitology". The whole paper may be read with interest and profit; the part concerning us here is that dealing with "strange theories and erroneous beliefs". Hoeppli remarks that as late as 1801 a German author named Jördens, in two beautifully illustrated volumes, published reports of toads in the intestinal tract and in abscesses, frogs in the stomach and intestine and the female genital organs, and lizards and snakes in the intestinal tract. Jördens believed that frogs, toads, lizards and snakes could develop from eggs accidentally swallowed in drinking water and could actually multiply in the human intestine. As evidence that he was not readily gullible is his refusal to believe the report of one Thuemig that a Russian had vomited a young dog or that a boy had passed a dog in his stool.

Hoeppli points out that a belief in the spontaneous generation of intestinal worms and other parasites was current until the work of Pasteur and Tyndall disproved it. People who suffered from worm infestation were said to have a *diathesis helminthica* or *constitutio verminosa*; for some unexplained reason their intestinal contents or fragments of mucous membrane became "animated" and developed into worms. When biology was but an embryo science Athanasius Kircher, the learned Jesuit, declared that *putrefactio animalcula generat*—a conclusion that he drew no doubt from his observation of crawling things in rotting organic matter. As late as 1816, Olombel, a French army surgeon, expressed the opinion that fleas could be generated spontaneously. It is remarkable that even in the enlightened days of the twentieth century, beliefs in spontaneous generation still exist among lay people: many believe that a horsehair left lying in water will eventually develop into a worm; comedones are still regarded by many as worms having their origin in the human skin.

Vallismérus (1671-1730) believed that parasitic worms were inherited; Jördens held a similar view, and he assumed that the ova circulated in the blood and were excreted in the milk. Brera (1803) did not believe that the worms were inborn, but that the eggs were communicated to the foetus in the mother's uterus; he stressed the danger of the transmission of ova by the milk of an infested wet nurse or the saliva of the nurse when she kissed the child.

A delightful conception of helminth infestation was that the eggs were present in Adam and Eve in Paradise and developed only to worms when their hosts had eaten the forbidden fruit.

A discussion of worms is not complete without reference to the "tooth worm", which caused tooth-ache, and the "navel worm", the dread *Vermis umbilicalis*, which lived in or around a child's umbilicus and sapped its victim's strength. The diagnosis of infestation with the "navel worm" was made by bandaging a small fish on the child's umbilicus in the evening; if in the morning a portion of the fish had vanished, the presence of the worm was regarded as proven. As treatment for the *Vermis umbilicalis*, honey mixed with powdered glass was applied; the worm ate the tasty mixture and died as a result of poisoning with the glass.

Here and there in the literature are found references to the susceptibility of worms to music. One patient, for example, who harboured a tape-worm, felt very uncomfortable in church when the organist commenced to play. It was even suggested that various kinds of musical instruments should be played to find which was most objectionable to tapeworms. The tapeworms of today must be deaf.

Hoeppli has to turn to Chinese medical literature for his richest piece of humour; the translation of a passage in *Pao aging Ts'o agao* (about A.D. 1506) reads as follows:

All worms in the abdomen turn their heads upwards during the first half of the month and downwards in the second. The required treatment is to fry a piece of pig's liver in order to let the patient smell the delicious odour so that the worm turns the head upwards. This process is essential before the drug is given.

Surely a ruse devised with Oriental cunning, but withal a dirty trick to play on an epicurean helminth.

LIVER DAMAGE IN CATARRHAL JAUNDICE.

INTEREST in the non-surgical forms of jaundice has been stimulated of recent years by investigations in several fields. The occurrence of Weil's disease in several countries in the world, the recognition of the hepatic damage that may be wrought by drugs of the cinchophen series, the study of jaundice in syphilis, and the proof that the simple catarrhal jaundice actually causes spoiling of the liver cells have all aroused interest. This interest was stirred by Rolleston, McNee, Van den Bergh and contemporary workers some years ago and, judging by the new work still appearing on the subject, should be maintained in a most fruitful topic. It has always been assumed that one characteristic of catarrhal jaundice is that it is a benign affection and that the hepatic reserve is so great that complete and lasting recovery might confidently be looked for.

An investigation into the possibility of there being any residual damage to the liver has been made by L. J. Soffer and M. Paulson.¹ The brief

description they give of the disease shows that there are yet uncertainties about its nature and cause, for after mentioning the well-known pyrexial state with tenderness and enlargement of the liver, jaundice, the presence of bile pigments in the urine but usual absence from the faeces, they state that all other known causes of jaundice are eliminated. Surely this is not easy to do, for the diagnosis usually rests largely on a simple clinical basis. Their material was selected from the records of the Johns Hopkins Hospital. The patients selected were those who appeared beyond doubt to have suffered from catarrhal jaundice at periods ranging from some months to eighteen years prior to their study. A complete history was taken, careful routine physical examination made, a Van den Bergh test made on the blood serum and, where possible, cholecystography and duodenal drainage were also carried out. In addition, they applied the bilirubin retention test, which they believe to be the most sensitive method for determining the state of the hepatic function. In this test bilirubin in amount equal to one milligramme per kilogram body weight is injected intravenously in alkaline solution, and the bilirubin is estimated in the blood plasma before the injection, five minutes later, and again after four hours. The second sample of blood is considered to contain its equivalent of 100% of the injected pigment plus the bilirubin content of the plasma before the injection. This figure may be compared with that in the four-hour specimen, again an allowance being made for the bilirubin content of the control. A retention of more than 5% of the injected pigment after four hours is considered pathological. The result of this investigation was as follows. In only one case was there any degree of failure of the gall-bladder to concentrate dye in the Graham test; also duodenal drainage revealed no abnormality in the bile in any instance. Though nothing unusual was found on physical examination of any of these patients, half of them complained of vague digestive disturbances. The bilirubin test, however, revealed an abnormal degree of bilirubin retention in nine cases out of eleven. No such retention occurred in controls. It was found that the degree of bilirubin concentration did not vary in proportion with the severity of the previous attack of jaundice. For example, in one case the patient was symptomless and jaundice was originally detected by a friend, yet a year later the bilirubin test revealed a retention of 16.2%, a great increase over the normal limit of 5%.

This work is interesting and requires confirmation. An obvious criticism is that it depends upon a test the validity and value of which are not yet universally recognized. Tests of hepatic function are apt to come in like lions and depart like lambs; this is, however, an argument for further attention being paid to the subject. Moreover, a more careful study of the so-called catarrhal jaundice is greatly needed; not only is there more to be learned of its nature and causes, but, if the thesis of Soffer and Paulson is sustained, also of its effects.

¹ Archives of Internal Medicine, June, 1934.

Abstracts from Current Medical Literature.

GYNÆCOLOGY.

Effect of Prolan on the Non-Functioning Ovary.

R. A. TSCHERTOK and G. W. PENKOW (*Monatsschrift für Geburtshilfe und Gynäkologie*, June, 1934) have studied the effect of injections of the urine of pregnant women into seven patients at the end of the reproductive cycle, when ovarian secretion would be decreasing. The injections were given over varying periods, and in all from 70 to 500 mouse units of prolan were calculated to have been injected. When the abdomens were opened for various gynaecological indications, the ovaries were carefully inspected for signs of stimulation and, if possible, the ovary was also removed for section, while uterine scrapings were taken to discover any endometrial effect. In no instance was there any evidence of stimulation in these ovaries by the injections of pregnancy urine. They summarize the work of Zondek and others, and conclude that prolan will produce results only if the loss of ovarian activity be fairly recent.

Unusual Case of Gynatresia.

K. HOLZAPFEL (*Monatsschrift für Geburtshilfe und Gynäkologie*, May, 1934) describes an unusual case of atresia of the genital organs. The patient, aged thirteen years, had not yet menstruated and an abdominal tumour was observed by her parents. The hymen was intact and there were neither signs nor a history of pregnancy. The abdomen was opened and the mass found to be a grossly dilated vagina and cervix. After closure of the abdomen the thick hymen was incised and a large amount of thin pus escaped from which were grown pure cultures of hemolytic streptococci. The only possible cause of the retention of fluid was that the child had what was described as severe measles four years previously. Holzapfel believes that this was really scarlet fever which was associated with a suppurative vaginitis, the closure of the hymen and gradual increase in the fluid. The differential diagnosis of such tumours is carefully discussed. The patient made an uninterrupted recovery and menstruation commenced nine months later.

Diathermy Treatment of Mastitis.

A. N. POLJANSKAJA (*Monatsschrift für Geburtshilfe und Gynäkologie*, April, 1934) discusses the treatment of mastitis, especially when fistulous tracks are hindering healing. He strongly advises the use of diathermy for such states. Two lead plates, 35 centimetres square, are laid on both sides of the infiltrated area. A current of 0.3 to 0.5 ampere is applied for ten to twenty minutes. At first daily applications are given and then

on alternate days. In a group of nine cases in which treatment was started on the first signs of inflammation, complete resolution occurred with five and the remaining four required incision. A second group of twenty cases comprised those in which incisions had already been made. After each application the discharge increased and became thinner, the induration quickly disappeared and pain was minimal. The wound granulated quickly with a soft scar. A third group of eleven cases comprised those of some duration in which incisions had been repeated several times. Rapid improvement invariably followed treatment. On the average twelve to fifteen applications were needed to effect a cure, except in very chronic cases.

Prophylactic Plastic Operations for Uterine Malformations.

F. RHEMANN (*Monatsschrift für Geburtshilfe und Gynäkologie*, April, 1934) describes a case of *uterus bicornis bicolle* in which the condition was diagnosed only after the patient had had seven spontaneous deliveries. As one uterus was larger than the other, the pregnancies probably all occurred in it. The upper portion of the vaginal septum had been torn during the deliveries. In two other cases the condition was one of *uterus septus*, which was diagnosed during manual exploration for a retained placenta. In two further cases the uteri were removed for gynaecological reasons, while the obstetric histories were normal. A review of the literature shows that the risks of accidents, such as rupture, are uncommon during pregnancy and labour. The author is of the opinion that plastic operations should not be lightly undertaken in these conditions, but reserved for cases in which habitual abortion has occurred or in which premature labour is likely to take place. The patient should fully understand the risks attached to such operative procedures before they are attempted.

Carcinoma of the Cervix Uteri in Pregnancy and Labour.

IN *The Journal of Obstetrics and Gynecology of the British Empire*, June, 1934, four authors report their experience in treating carcinoma of the cervix during pregnancy and labour. In C. Oldfield's case the condition was not discovered till labour had been in progress for some hours. A small piece of the tumour was punched out for examination. Then a Wertheim's hysterectomy was performed without Cesarean section. The patient made a good recovery. Fourteen days after the operation she was given 4,500 milligramme-hours of radium in three applications, followed by deep X ray therapy. Twelve months later the patient appeared well. The second case, reported by A. M. Claye, was first noticed during labour, when the cervix was found to be the seat of a dense pale growth. A live female child was delivered by lower segment

Cesarean section. Fourteen days later 40 milligrammes of radium were inserted into the uterus and 45 milligrammes into one fornix and 30 milligrammes into the other. This radium was left *in situ* for twenty hours. The radium application was repeated seven days later and again in one month. The patient did not receive any X ray application. For the past two years she has been well. The third case is reported by Comyns Berkeley. This patient was treated in 1914. The condition was discovered when the patient was twenty-six weeks pregnant. She refused to submit to a hysterectomy, desiring a live child. On two occasions 2.32 milligrammes of radium in needles were inserted at intervals of three weeks. At term a classical Cesarean section was performed. After the sewing up of the uterine scar a Wertheim's radical operation with removal of iliac and obturator glands was performed. The child had two bald patches on an otherwise hairy head. The child, now a girl of twenty, is quite well, and at fifteen years cleared a record high jump. The mother is still alive. The fourth case is reported by A. W. W. Van Rooy. In this instance normal delivery took place after radium treatment during pregnancy. The patient was four months pregnant and a typical cauliflower-like tumour at the portio was found. The patient refused operation. A dose of 4.2 milligramme-hours of radium element was given over eight days. The tumour disappeared. At term a healthy child was born spontaneously after eight hours of labour. After the puerperium a second dose of radium was given, bringing the total dose up to 7.2 milligramme-hours of radium element. The child and mother up to the present appear healthy.

Dysmenorrhœa and Resection of the Presacral Sympathetic Nerves.

VIRGIL S. COUNCILLOR AND WINCHELL MCK. CRAIG (*American Journal of Obstetrics and Gynecology*, August, 1934), after reviewing the general considerations of dysmenorrhœa, with its subdivision into primary and secondary types, discuss the treatment of dysmenorrhœa by surgically interrupting the sympathetic innervation of the generative organs. After briefly reviewing the history of the operation, they state that at the Mayo Clinic resection of the presacral nerve has been performed in fourteen cases of dysmenorrhœa. Any associated pelvic pathological condition was corrected at the same operation. The authors then give the case histories of fourteen patients for whom they claim complete relief or at least 75% to 95% relief from pain, but their reports in the majority of cases cover only a period of one to three months after operation. The authors claim, however, that their figures are satisfactory and that the method should be continued in use until the establishment of some simpler method that will give the same beneficial results. Pregnancy has not occurred in any of

the patients since the presacral resection was performed, although seven of the patients were married and had previously had children.

Menstrual Disturbances of Endocrine Function.

C. A. ELDON (*American Journal of Obstetrics and Gynecology*, August, 1934) has discussed the treatment along endocrine lines of menstrual disturbances in which anatomical and pathological pelvic causes are eliminated and systemic diseases excluded. He has examined the recent literature in regard to menstrual disturbances occurring in various endocrine and non-endocrine diseases, and reviews the position under the light thrown on it by the present knowledge of endocrine physiology. Sixty patients have been studied by an exhaustive investigation over a period of six months to two years, many of them with negative results. After an exhaustive examination of his material and case histories the author has concluded that there is no relation between the type of menstrual disturbance and the endocrine gland primarily involved. Diagnosis of menstrual disturbances should not be made on laboratory findings alone. Thyroid extract has a definite value in the treatment of many of these cases.

OBSTETRICS.

The Treatment of Colpitis during Pregnancy.

N. A. BORISSOWA (*Monatsschrift für Geburtshilfe und Gynäkologie*, June, 1934) discusses the aetiology of pruritus and leucorrhœa during pregnancy, and in particular refers to the rôle played by the trichomonas organism in such cases. He has used a preparation of Bulgarian sour milk called "Biolaktin", prepared three days previously, and with a pH of 3.4. The patient is placed in the dorsal position and five to six cubic centimetres are instilled into the vagina. After resting in this posture for five minutes the patient is allowed to go home. Vaginal douching is prohibited. At first injections are given every day and then on alternate days, the number being controlled by smears. In 146 cases trichomonas infection was observed in 46%. From one to five instillations were required to clear up pruritus and leucorrhœa and to note a rapid healing of any cervical erosion. This method of treatment is valuable because of its simplicity, absence of toxic substances and lack of complicated manœuvres in application.

Puerperal Gas Infections.

G. SIMONSON (*Monatsschrift für Geburtshilfe und Gynäkologie*, April, 1934) describes four cases of gas bacillus infection. One was associated with an incomplete abortion, while a second followed craniotomy for an

obstructed delivery. The third was a case of retained placenta following a miscarriage. The usual signs of gas infection developed, but the injection of fifty cubic centimetres of gas anti-serum was sufficient to clear up the condition. The fourth case was one of a macerated fetus in which the placenta was manually removed. Although some improvement was noted after repeated injections of serum, death occurred on the ninth day from uremia. The serum had apparently localized the infection to the kidneys, but any regeneration of the renal tissues was prevented by the rapid onset of uremia.

The Effect of the Method of Delivery on Neonatal Mortality.

K. BURGER (*Monatsschrift für Geburtshilfe und Gynäkologie*, May, 1934) discusses the effects of various methods of delivery on the fetus, especially in the neonatal period. The reason that premature children do not survive is not so much because they are premature, but that they are not sufficiently mature to withstand birth trauma. As regards mature infants, autopsy findings show that birth injuries occur almost as frequently with spontaneous as with operative deliveries. It would appear that such injuries are largely due to delay in assisting labour. The author emphasizes the value of external cephalic version in all instances in which the vertex does not present, because the fetal mortality is only a fifth of that following breech delivery. Burger considers that the timely use of forceps will save more children than allowing a labour to drag on to a spontaneous end. He has obtained the after-histories of 230 children delivered with forceps. Nineteen died from various causes, none of which were attributable to the forceps. The number of nervous diseases which developed after a forceps delivery was no greater than when the delivery was spontaneous. Prophylaxis must be concentrated on continuous antenatal supervision and timely help during labour when necessary.

Bilirubin Excretion Test.

C. F. SULLIVAN, W. P. TEW AND E. M. WATSON (*The Journal of Obstetrics and Gynaecology of the British Empire*, June, 1934) report their investigation of liver function in pregnancy by the von Bergmann bilirubin excretion test. They found that the liver function in the first half of normal pregnancy, as determined by the bilirubin test, is unimpaired, but during the second half evidence of disturbance of function can be demonstrated in at least 30% of cases. The cause of this impaired excretory power of the liver in normal pregnancy renders the interpretation in abnormal cases difficult. Toxic patients with signs of renal insufficiency tend to show less retention of injected bilirubin than those with normal kidney function. Thus to some extent it is possible to

differentiate the toxemias of pregnancy into nephritic and hepatic types. The bilirubin test reveals retention in such a large percentage of normal cases that its value is not of practical importance. The impairment of liver function which occurs during pregnancy, both normal and abnormal, is of a temporary nature, as the results of the bilirubin excretion test return to normal following termination of pregnancy. Owing to its limited usefulness and technical difficulties, the authors believe that it is unlikely to become a routine procedure.

An Analysis of 3,301 Breech Deliveries.

C. A. GORDON, R. GARLICK AND P. OGINZ (*American Journal of Obstetrics and Gynecology*, July, 1934) analyse the histories of 3,301 breech deliveries occurring in thirty-two Brooklyn hospitals. Cases of labour with twins, *placenta praevia*, podalic version, congenital defects and prematurity in which the child weighed less than 2.2 kilograms (five pounds) were excluded, leaving 2,616 cases; these showed a fetal mortality of 12.6%. When these figures are further analysed, it is found that 61% of the patients were delivered spontaneously or were assisted by the ordinary methods of suprapubic pressure *et cetera*; and these showed a fetal mortality of 6.7%. In the next group, in which the fetus was extracted, as in frank breech presentation *et cetera*, the fetal death rate was 18.7%. In the third group of 405 cases, in which the breech was "broken up", as when one leg was brought down, the fetal death rate rose to 28.9%. In addition a definite number of injuries to the fetus is recorded. Caesarean section was performed on forty-four patients; the average length of labour before section was eighteen hours. Six patients only were not in labour. The maternal mortality rate in these cases was 11.4% and the fetal mortality rate 0.45%.

The Inertia Syndrome.

J. R. GOODALL (*The Journal of Obstetrics and Gynaecology of the British Empire*, April, 1934) describes the type of patient prone to primary uterine inertia. Such patients are usually fat, short-necked, flat-nosed, and have nasal speech; they have thick unhealthy membranes. Many of the patients present male characteristics. There are many patients, however, who do not conform to this type. Patients who have inertia often show after some hours in labour signs of distension of the colon, which frequently crowds the uterus to one side and further increases the difficulty by producing an obliquity of the uterus. The bladder is likewise suffering from inertia. The splanchnic nerve controls all these organs, and thus it is a disturbance of the autonomic system which is controlled by the endocrine glands, and the author concludes that primary uterine inertia is an endocrine disturbance.

Special Articles on Treatment.

(Contributed by request.)

XL.

TREATMENT OF WATER ON THE KNEE.

THE use of the popular expression in the title of this article is deliberate in order to stress the fact that it is not more unscientific than the synonym "fluid in the joint" of the practitioner. There is fluid in every living joint, and we would do better to speak of "excess fluid in the knee joint" or, better still, of "fluid distension of the knee joint".

The knee joint is of large capacity. It is superficial, in front of the body. It is readily accessible and the most readily examined by the patient of all his joints. He is thus quick to detect a degree of fluid distension which would pass unnoticed in other joints, and he is apt to assign to this symptom the attributes of a definite disease. We do not hear the layman speak of "water on the elbow, on the hip, shoulder or ankle".

A joint may be distended by synovial fluid, serum, blood, pus, pyogenic or tuberculous, or by an admixture of several of these. We are concerned here only with synovial distension, but it is necessary to remember that following certain injuries involving the knee joint there may be blood and later serum as well as excess synovial fluid in the cavity.

The clinician must decide as to the nature of the fluid distending the joint in any given case, remembering that hemophilia may manifest itself by filling the knee joint tightly with blood.

Fluid distension of the knee joint is a symptom of various adverse influences acting on the joint, and whilst we are thus called upon to discuss the treatment of a symptom, it will be necessary to keep in mind the causes underlying the symptom in order to discover a correct basis for our treatment.

Fluid distension *per se*, from whatever cause, and where the fluid in question is synovia, calls for no treatment unless it becomes excessive and prolonged. In these cases the joint should be emptied through a large bore needle or cannula; the actual method will be discussed later. In one of the writer's cases it was necessary to empty a tuberculous knee joint in order to slip the ring of a supporting caliper over it.

The knee joint may be distended suddenly or gradually as the result of local disease, or a general disease, or a distant focus of disease, and as a result of injury.

Disease.

Any inflammatory process which irritates the synovial membrane is liable to cause it to function to excess and to distend the joint with fluid.

In such cases the most potent factor in relieving distension is rest, which must be maintained whilst any sign of inflammation persists. The guide to the presence of active inflammation is tenderness, and whilst this can be elicited the joint must be rested on an adequate splint. In the application of the splint a certain amount of compression may be applied to the joint, which will help materially in the reduction of the fluid content.

It has yet to be appreciated by our profession that uninterrupted rest is of far more value in relieving inflammation than fussy therapy with fomentants, lotions and local applications.

To splint the limb adequately and leave it alone is sound practice.

Injury.

Probably the most frequent cause of the appearance of the symptom under discussion is injury. Direct blows, sprains and ligamentous tears within or without the joint are familiar examples. In many cases the fluid is so little in excess that it escapes notice, but quite frequently it is sufficient to float the patella.

In the slight forms, when we can be sure that no gross damage has been done to any structure within or without the joint, the fluid excess may be disregarded and there need be no interruption in the active and ordinary use of the limb. Such use will provide the best means of getting rid of the fluid excess and of restoring the joint to normal.

When, however, any such structure has been damaged, the knee should be supported by a compression bandage, or in severe cases by a light plaster cast, which must extend from well up the thigh to well down the leg. The use of compression and plaster support may in many cases be profitably combined.

The compression bandage is very valuable, since it not only provides the knee with a comfortable elastic support, but it has a marked effect as far as getting rid of excess fluid is concerned. In the experience of the writer it is much more effective and certainly much less messy and disagreeable than the traditional Scott's dressing.

A simple method of applying a compression bandage is as follows: Lay out a one pound roll of good quality cotton wool on a table and cut from it two strips four inches wide and of the full length if the patient is an adult. If the wool is very thick, one strip only need be cut, and this can be split into two layers. Each strip or layer is then rolled into bandage form.

One of these is then applied like a bandage from well below the knee to well up the thigh. A bandage of calico or Japanese crêpe, not less than three inches wide, is then applied firmly over it, care being taken to leave about one inch of the wool above and below uncovered. The second strip or layer of wool is then applied over these and secured by a second bandage applied quite tightly, a narrow strip of wool again being left uncovered at either end. To prevent the whole from slipping, a strip of soft calico is placed in front of the limb over the first completed layer and overlapping it at each end. It is lightly pinned to the first layer and its distal free end is brought up in front of the second completed layer and pinned to the latter. The other free end is secured above to braces or suspenders and holds the apparatus comfortably in place. The bandages of wool and crêpe need adjustment from time to time as they loosen.

It is not necessary to discontinue weight-bearing in the case of an injured knee, provided the bearing surfaces or menisci have not been injured, provided also that the injured structure is guarded from strain by a compression bandage or cast. When the internal lateral or tibial collateral ligament has been strained or torn, a useful adjunct to cast or compression bandage is to raise the inner border of the heel of the boot or shoe one-eighth of an inch.

At the earliest possible moment following injury splintage should be discarded and active movements should be carried out. So-called passive movements are useless in such cases and have no place in the therapy of injured joints. If movement is limited by some factor such as the presence of adhesions, these should be broken down as early as possible with or without an anaesthetic and at one sitting unless they are so gross as to demand several manipulations.

In some cases it may be necessary to assist the patient in carrying out his active movements, but such a measure is totally different from so-called passive movement.

Even when the knee joint is controlled by a compression bandage or cast the patient should be shown how to maintain quadriceps control by contracting and relaxing the muscle. This is an essential of treatment in knee joint injuries.

It is not necessary to wait for excess fluid to disappear after injury before commencing movements. The only indication againsts movement is the possible tearing or over-stretching of some damaged and healing structure. The clinician must use his judgement, based upon a sound understanding of the nature of the injury, in deciding this question.

When fluid excess is associated with recurrent displacement of a meniscus, and it is not a frequent accompaniment to such injuries, and with the presence of loose bodies in the joint, its alleviation is bound up with the correction of these anomalies.

There is a type of fluid distension which is recurrent and which is a late sequel to injury of the knee. In the great majority of these cases one or both of the following conditions will be found: the presence of adhesions and/or weakened muscular control, particularly by the quadriceps muscle. It must be stressed that many adhesions escape notice because they affect only a small range of movement. They must be carefully looked for, it being remembered that in some cases the only movement with which they interfere is rotation.

In estimating the factor of quadriceps control the tone of the muscle is of more importance than the loss of muscular substance, that is, many muscles which show no diminution in girth on measurement are yet flabby and lack the power of brisk and firm contraction. Conversely, many muscles which show diminution of girth after injury acquire full tone after treatment, and it may take many months before the original girth is restored, although in the meantime the muscle control may be excellent.

Loss of girth may be detected by measurement. In many cases comparative measurements of the thigh are carried out in a haphazard and inaccurate way. To guess at the corresponding levels in each thigh and to measure to a common point from the upper or lower border of each patella are both faulty and of very little value.

A sound and accurate method is to measure from the tip of each medial malleolus, marking off the various levels opposite the main muscle masses, the *vastus medialis*, the main mass of the quadriceps in the centre of the thigh and of the upper thigh groups in the upper third.

With a record of such measurements, comparisons which are accurate may be made by measurements at exactly corresponding levels many months or years afterwards. The only exception to this is when from any reason one lower limb is shorter than the other. Such measurements are recorded thus:

| Level. | Right. | Left. |
|--------|--------|-------|
| ↑ 27 | 20 | 20 |
| 24 | 17½ | 18 |
| 18½ | 13½ | 14 |

The arrow is a conventional sign used by the writer to denote that the measurements have been made from below upwards and not, as in a few cases, from the anterior superior iliac spine downwards.

The treatment of this disability is to free the joint of any adhesions which may be present and then by graduated exercises to restore the tone to the weakened muscles. A simple method of giving such exercises is to have the patient arrange a simple apparatus whereby he can attach a weight to his heel and lift it by bringing his leg to the horizontal over the end of a table. If the weight is attached to the end of a long cord, which passes through a pulley fixed beneath the table well behind the patient, the effect is better still. The weight may be gradually increased, as well as the number of times it is lifted. In this way the amount of work done by the group under exercise may be accurately controlled. Fatigue of the muscle should be avoided during treatment.

Mention has been made of aspiration or emptying the knee of fluid under certain conditions. The method of the writer is as follows. The knee region is prepared as carefully as for arthrotomy. The patient lies on the side of the affected joint with the knee flexed and projecting over the edge of a table. The skin over the triangle formed by the lateral border of the *ligamentum patellae* and the condyles of the femur and tibia is anaesthetized. A small incision is made in the skin and the edges are retracted by means of a suture placed in each. The trochar or needle is passed straight into the joint, care being taken to avoid contact with the skin. The fluid is allowed to drain to the fullest extent possible. The instrument is withdrawn, the skin is closed by one

suture and sealed by collodion, and a compression bandage is immediately applied.

If desired, the aspiration may be carried out by a similar technique applied to the inner triangle. By this method gravity helps to drain the joint, and the synovial fringes, flecks of lymph or other agencies which are liable to block the instrument tend to float to the surface of the fluid away from the lumen of the latter.

A word with regard to knee cages, which are often ordered where fluid distension is a feature of the disability under treatment. In spite of the commendation of many authoritative surgeons, the writer unhesitatingly condemns their use, except in cases of gross and permanent instability of the joint, where operation is refused or contraindicated for any reason. This adverse opinion was formed as the result of observation on returned soldiers, many of whom wore these appliances for long periods. To attain their maximum efficiency these appliances must grasp the thigh and leg firmly, and in so doing they cause definite and constant and in some cases gross pressure atrophy of the underlying muscle substance, particularly of the *vastus medialis*. It is to be remembered also that no matter how firmly they grasp the limb, they cannot control rotation between tibia and femur unless they limit flexion to but a few degrees.

When there has been gross injury to the knee and the joint comes subsequently to be constantly distended with fluid and to show increasing instability, and when the methods of treatment outlined fail to give relief, the treatment is to fix the joint either by arthrodesis or by some accurately fitting moulded leather or celluloid splint.

Electrical Stimulation of Thigh Muscles.

Many clinicians pin their faith to graduated electrical contractions in dealing with weakened thigh muscles, particularly the quadriceps. It is the firm conviction of the writer that no electrical stimulation of a muscle can produce anything comparable in therapeutic efficiency with the contraction elicited through the ordinary physiological channels by the patient's own volition. Holding this belief, electrical stimulation of weakened muscle as a therapeutic measure is not used by the writer.

D. J. GLISSAN, M.B. (Sydney), F.R.A.C.S.,
Honorary Orthopaedic Surgeon, Saint
Vincent's Hospital; Honorary Assistant
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British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Medical Society Hall, East Melbourne, on August 8, 1934, DR. GERALD WEIGALL, the President, in the chair.

Deaths from Appendicitis.

DR. C. J. OFFICER BROWN read a paper entitled: "Deaths from Appendicitis" (see page 407).

DR. ALAN NEWTON said that he wished to congratulate Dr. Officer Brown most heartily upon a masterly statistical summary of over one thousand cases of appendicitis. Those present who had undertaken a similar statistical task could appreciate fully the toil involved in compiling a truthful summary such as that to which they had been privileged to listen that evening. Dr. Newton also wished to congratulate him even more heartily upon the common sense and sound judgement manifested in his personal opinions concerning the treatment of the disease. Dr. Newton had no destructive criticism to offer, for he was for the most part in complete agreement with all that Dr. Brown had said.

Dr. Newton did not wish to initiate an acrid debate, so common in discussions on the treatment of appendicitis, upon the merits and demerits of the drainage tube or of

delayed as opposed to immediate operation. He believed in the dictum: "When in doubt, drain", and considered that it would be just as great a tragedy to promulgate the belief that it was an act of surgical cowardice to insert a drainage tube as to advocate the indiscriminate adoption of the delayed operation. Each case of appendicitis had to be considered on its merits, for no two cases were precisely similar.

Dr. Newton agreed with Dr. Brown that it was proper to remove the appendix, if possible, when the abdomen was opened for a non-urgent condition of some other abdominal viscus. The first patient submitted to gastrectomy at the Melbourne Hospital died on the tenth day from general peritonitis, which was thought to be due to leakage at the suture line, until at the autopsy a gangrenous appendix was revealed. Dr. Newton had seen several cases of acute appendicitis which could have been avoided by the routine removal of the appendix at a former abdominal operation.

There were many other points in Dr. Brown's paper to which he would like to refer. He was interested to find that there were no cases of subphrenic abscess in Dr. Brown's series. Dr. Newton agreed with him that gentle handling was essential. Most cases of post-operative ileus were caused by the surgeon. Dr. Newton had seen a man feverishly clawing at the small intestine in an effort to find the appendix, with the inevitable occurrence of post-operative ileus. He was impressed by Dr. Brown's experience of the usefulness of gas gangrene antiserum, though he had no personal knowledge of its value.

The time at his disposal did not permit him to discuss these questions at any length. He proposed, therefore, to confine himself to a discussion of a most striking fact mentioned by Dr. Brown, namely, the progressive increase in the death rate from appendicitis. Dr. Brown had shown that there was an amazing decrease in the mortality rate of this disease between 1904 and 1912, which was due mainly to an earlier diagnosis of the disease as its clinical signs became more widely appreciated. He had then pointed out that the mortality rate had steadily increased in recent years, not only in Australia, but also in America and England. Reviewing the last four five-years periods in Victoria he showed that the death rate from appendicitis had risen from 63.2 to 75.8 per million of population. Dr. Newton concluded, just as he had concluded in a paper to which Dr. Brown had referred, that this increase was due to delay in performing an operation. There was no doubt that there would always be an appreciable death rate in appendicitis due to delay either on the part of the patient in seeking advice or on the part of the doctor in making the diagnosis, but Dr. Newton did not believe that this delay was greater today than it had been twenty years before. He did not think that members of the public contemplated a bellyache with greater placidity now than twenty years previously. He did not believe that doctors of today were less watchful for signs of appendicitis than were their predecessors; indeed there was some ground for the belief that this condition was frequently diagnosed nowadays before it had occurred at all. Dr. Newton was impressed by the fact that, coincident with the rise in the total number of deaths from appendicitis throughout Victoria, there was a fall in the mortality in the large clinical hospitals. During this period of twenty years the death rate at the Melbourne Hospital had fallen from 6.4% to 4.9%, and Dr. Brown reported a death rate at the Alfred Hospital of 3.9% in over one thousand cases.

It was therefore obvious that another factor was involved in the production of a rise in the death rate from appendicitis and that, therefore, Dr. Brown's conclusions, and Dr. Newton's conclusions in his paper, were inadequate to explain the increased mortality. In venturing to suggest another factor, he wished to explain that he had been in practice for twenty-five years and that during this time he had seen a great change in conditions of practice in so far as the treatment of acute appendicitis was concerned. The period of a falling death rate due to earlier diagnosis was followed by a period during which operative measures for the cure of this disease were still undertaken for the most part by specialists in surgery. All this had now changed. Operations for acute appendi-

citis no longer figured prominently in the operation lists of surgical specialists. In point of fact, it was rather ridiculous to invite him to join in a discussion on this subject, for in his private practice during the last five years he had operated in only 68 cases of acute appendicitis, although in the same space of time he had performed 340 operations for gall-stones, a less common disease. There was today a general belief that appendicitis was a simple disease and that appendectomy was a simple operation. There was a general belief that every practitioner should be qualified to perform this operation and that to refuse to do so amounted almost to a confession of professional incompetence. Yet they all knew that though the majority of operations for appendicitis were easy, there were many which taxed to the uttermost the skill and judgement of an experienced surgeon. Both types looked alike from outside. It was only after the abdomen was opened that technical difficulties were manifested. Dr. Newton begged his listeners to refrain from interpreting his remarks as an attack upon general practitioners, for they all realized that many general practitioners were skilful surgeons. He did suggest that the cause of the rising death rate in the community from appendicitis was because it had come about that every practitioner was expected to operate upon patients with acute appendicitis occurring in his practice, and because it was not improbable that if an unskilled operator met a difficult case the total death rate would be increased by one more unit.

This condition of affairs was not peculiar to Australia. It probably applied with equal force perhaps to England and certainly to America. Jeff Miller, of New Orleans, had recently written that a study of statistics could not fail to convince one that much of the present mortality in appendicitis was due to the occasional operator and to the licence with which, "in this land of the free", any person with the will to do so was permitted to wield the knife.

He believed, therefore, that under the present conditions of medical practice a decrease in the mortality from appendicitis could best be achieved by affording to practitioners better opportunities for an education in practical surgery, and he trusted that the efforts of the Royal Australasian College of Surgeons in this direction would receive the approval and support of the British Medical Association.

He did not wish to minimize the factor of delay in performing appendectomy as a cause of the mortality in appendicitis. Unhappily they must realize that, until the end of time, some patients would fail to seek medical aid until general peritonitis was present, while others would present a symptom complex so atypical that delay in making a diagnosis was excusable. It seemed to him that the salvation of such patients in the future lay in the hands of the bacteriologist rather than in those of the surgeon.

He felt that he must once more thank Dr. Brown for his paper and assure him that they would give earnest heed to the things which he had told them that night.

Dr. H. B. DEVINE said that he wished to congratulate Dr. Brown, not only on his scholarly paper, but on his happy choice of subject. He had chosen such a practical subject for his paper that the discussion of it should be of much value to all present. On such a paper a straightforward discussion of failures and a comparison of experiences should enable them to revise their methods so that in the future they might get better results.

In effect, what Dr. Brown said was that the mortality rate for operations for acute appendicitis in most public hospitals had been steadily decreasing, while for operations outside public hospitals in the State of Victoria, as shown by the Statist's report, the rate was increasing at rather an alarming rate. He had quoted figures taken from a large series of cases operated on at the Alfred Hospital, which showed this gradual decrease in mortality. Statistics which Dr. Devine had had taken out for Saint Vincent's Hospital showed the same decrease of mortality as did Dr. Brown's figures: in 1912 the mortality was 4.43%, while in 1932 it had decreased to 2.7%.

It was a significant fact, shown in Dr. Brown's statistics, that the mortality rate for operations for acute appendicitis in Victoria, outside public hospitals, was rising almost as fast as that of the United States of

America. According to various American authorities, one of the reasons for the rise in their country was that of later years the operation for acute appendicitis was being carried out much more often by the practitioner in charge of the patient and much less by the hospital surgeon. That there was the same tendency in Australia there could be no doubt. Although many operations for acute appendicitis presented no special operative difficulty, there were a great number which required great surgical judgement and technical skill. Dr. Devine still found, after years of operating, that some of these cases taxed his surgical ability to the utmost. Yet, in comparison with the number of other, less difficult, operations which he had to do, he was not in recent years called on to do many of these cases. This he thought would also be found the experience of the junior hospital surgeon.

It was difficult to find any exact statistics which would throw light on this phase of growing appendicular mortality, which was a problem in other countries besides Australia. Hospital statistics were not available, for they showed a stationary or a decreasing mortality. There was, however, one hospital, that of the University Hospital of Upsala, in Sweden, in which the mortality for operations for acute appendicitis had been steadily increasing for the last ten years, and where the standard of the operating surgeon had remained practically unchanged. Investigations showed that this increase in mortality had taken place almost entirely in operations on the young and old, under twenty and over forty years of age. The suggestion was that appendicitis in the young and the old was often atypical and therefore not readily recognized; that in recent years, with the advance of knowledge, it was coming to be recognized more frequently and therefore operated on more frequently; and that, as operation in this type of case was more difficult and more dangerous, there were thus more operative deaths. This could not, in Dr. Devine's opinion, account for all the extra deaths to which Dr. Brown had drawn attention. However, if to this type of appendicitis in the young and the old they added the many atypical forms of appendicitis, and in particular that pernicious form, acute pelvic appendicitis, they got a group of appendicitis cases which he should like to call, for the purposes of the discussion, "malicious appendicitis". Operations for cases of appendicitis in this group were as a rule difficult and dangerous. It is his belief that the increase in appendicular mortality outside public hospitals would be found almost entirely in this group. This belief was based on the experience derived from many consultations in relation to appendicular operations, the post-operative course of which was unsatisfactory.

Sometimes the condition was attributable to an error of diagnosis—a failure to diagnose the condition in its early stages, either because there were no definite localizing symptoms or because the symptoms were unlike those of appendicitis. The operation had consequently been performed at a late stage of the disease. The consequences were as a rule serious when this occurred in an old person or child. At other times it was obviously caused by some operative error. The operation was too long in the circumstances. An appendix, practically irremovable because of its pathological condition, had been removed (or partially removed). An appendix which was removable and which should have been removed because it was necrotic or had become perforated had not been removed. The terminal part of the ileum had been damaged in the removal of an appendix subileally situated and ileus had developed. The small intestine had been handled too much and ileus had developed. The caecum had been torn during efforts to find or deliver the appendix. In some instances Dr. Devine felt that if a lateral split muscle approach, instead of a mid-line one, had been made, the condition would not have occurred. He felt that the mid-line approach to the acutely inflamed appendix with a spreading peritonitis or to the inflamed pelvic appendix had accounted for much post-operative appendicular mortality. It was an interesting fact that in the majority of cases these troubles occurred in that group which he had called "malicious appendicitis", and of this group in particular, in pelvic appendicitis. Dr. Devine did not think it was generally recognized how much pathological

knowledge and how much operative skill were required to get patients suffering from this type of appendicitis safely through their operation. He believed that in the past, by a process of wise selection of appendiceal operations on the part of the practitioner in charge of the case, many of these malicious types of cases found their way to the hospital-trained surgeon. Nowadays the earlier fear of the dangers of appendicitis had been lost in the wealth of successful operations, and this wise discrimination in relation to this dangerous type of appendicitis was no longer exercised.

Acute appendicitis was an innocent disease, and a mortality rate which their experience in public hospital told them was too high, must be regarded as reflecting on the skill and honour of the profession as a whole. What, then, could they as a profession do to lessen this increase in the mortality for operations for acute appendicitis outside public hospitals? If his observations and reasoning were correct, it was obvious that there was a certain type of appendicitis which demanded more surgical knowledge and operative skill for its successful surgical treatment than could be acquired in an undergraduate course. The only logical course to reduce the mortality in the future was, as Dr. Newton had said, to provide increased post-graduate training facilities in relation to operative surgery. Even the medical graduate who was lucky enough to become a resident medical officer, got little experience of operating in the altered conditions of inflamed tissues. Where, then, was this training to be obtained? He knew of no hospital in Australia which was open to post-graduate students. It was to lessen operative mortality by a system of training that the Royal Australasian College of Surgeons was brought into existence. With this end in view, it had helped already by arranging for additional surgical posts in the surgical clinics of hospitals. It had also been instrumental, as those present had been told, in getting the Homeopathic Hospital to organize as an Australian Post-Graduate School of Surgery, in which, it was hoped, practical tuition in surgery would be possible. It was because of problems such as Dr. Brown had put before them that the College would always try to widen, rather than to narrow, its sphere of influence.

DR. BALCOMBE QUICK also expressed his appreciation of Dr. Brown's paper. He considered that one statement made by Dr. Brown was perhaps more important than any other: that the approach to the appendix should always be a visual rather than a tactile one. This was one of the greatest factors making for safety in the operation for appendicitis. There was one matter, however, in which he differed from Dr. Brown and Dr. Devine, namely, the direction of approach to the appendix. In determining this it was obviously necessary to form an opinion as to the position of the appendix. The site of maximum tenderness was an important guide, and rectal examination should not be omitted. The presence and position of any mass might become apparent only after anaesthetization. This information having been obtained, the incision should be so planned as to give approach to the appendix, whether inflamed or associated with abscess, through the free general peritoneal cavity, as taught by the late John B. Murphy. In certain cases, particularly of pelvic appendix, this called for a mid-line incision. Only in this way was it possible, by the careful packing off of the inflamed appendix or abscess from the rest of the peritoneal cavity, to be absolutely certain of avoiding any peritoneal soiling during removal. Dr. Quick believed that this principle was definitely a life-saving one.

DR. H. DOUGLAS STEPHENS said that the practice at the Children's Hospital in cases of acute appendicitis was to operate immediately on diagnosis, and usually through the McBurney incision. In only a very few individual cases was operation delayed, following the Ochsner-Sherren method.

Statistics showed a mortality of 10% in cases operated on on the sixth day and later. Exactly the same mortality occurred in those operated on on the fourth day, but owing to the limited number in this group the figures might be unreliable. The advantages of early operation were shown by the record of 169 cases operated on within the first two days of the attack with four deaths, or a mortality of 2.2%. The total hospital mortality had fallen

from 4.3% in 1924-1925 and 4.7% in 1928-1930 (two years) to 3.3% in 1933-1934. Dr. Stephens was unable to say whether the mortality rate for appendicitis in children had increased out of proportion to the increase in population.

Rigidity and tenderness associated with intestinal odour of the breath were the clinical features that chiefly influenced him in deciding to operate. Cutaneous hyperesthesia was of little help, but a leucocytosis was sometimes a determining factor.

It seemed that in children there was much less tendency to ileus following diffuse peritonitis than was apparently the case in adults. Children between four and fourteen years seemed also to have a better resistance than adults to infection, whether localized or general, if the abdomen were properly drained after operation. This age incidence applied also to empyema. Babies under four years had much less resistance. Children's bowels apparently recovered better from toxic obstruction than from mechanical obstruction as compared with adults.

Dr. Stephens gave detailed figures of Children's Hospital statistics, which were as follow:

ACUTE APPENDICITIS.

(No chronic cases included.)

| | | Deaths. | Mortality. |
|--|-----|---------|------------|
| 1924-1925— | | | |
| Total cases for year .. | 93 | 4 | 4.3% |
| Including: | | | |
| Simple acute cases .. | 50 | 1 | 2.0% |
| Cases with peritonitis, that is, those with turbid fluid in the peritoneal cavity .. | 27 | 3 | 11.0% |
| Cases with abscess .. | 16 | 0 | 9.0% |
| 1928-1929 { | | | |
| 1929-1930 { | | | |
| Total cases for 2 years .. | 271 | 13 | 4.7% |
| Including: | | | |
| Simple acute cases .. | 159 | 4 | 2.5% |
| Cases with peritonitis .. | 90 | 9 | 10.0% |
| Cases with abscess .. | 22 | 2 | 9.0% |
| Patients under 4 years .. | 15 | 5 | 33.0% |
| Patients 4-14 years .. | 256 | 8 | 3.1% |
| Operation on— | | | |
| First day .. | 103 | 3 | 2.9% |
| Second day .. | 66 | 1 | 1.5% |
| Third day .. | 39 | 3 | 7.6% |
| Fourth day .. | 10 | 1 | 10.0% |
| Fifth day .. | 5 | 1 | 20.0% |
| Sixth day .. | 8 | 1 | 12.5% |
| After sixth day .. | 40 | 4 | 10.0% |
| 1933-1934— | | | |
| Total cases for year .. | 149 | 5 | 3.3% |
| Including: | | | |
| Simple acute cases .. | 102 | 1 | 1.0% |
| Cases with peritonitis .. | 30 | 3 | 10.0% |
| Cases with abscess .. | 17 | 1 | 5.8% |

Sixty-one cases in which operation was performed in an interval between attacks were not included here, as the mortality in this series was nil.

Dr. Brown, in reply, agreed with Dr. Newton that although delay was a factor of great importance in a series of cases like those presented, it was not the cause of the rising death rate.

Without operation only 10.20% of all patients suffering from appendicitis would die, and it was only in these cases that operation was likely to be difficult. It was not easy to pick the difficult case, and sometimes the most typical clinical case would turn out to be a strangulation of the lower part of the ileum requiring resection.

Dr. Devine had stressed the danger of pelvic appendicitis on account of the difficulty in reaching a diagnosis and because of the greater difficulty in the operation. With this Dr. Brown agreed, but he was opposed to the suggestion of Dr. Quick that the mid-line approach should

be used in cases of pelvic appendicitis. By dividing the base of the appendix and the vessels anchoring it near its base, as advocated by Dr. Devine, he found that the most deeply seated pelvic appendix could be freed and safely lifted out without bending it, and rupture could be avoided in this way.

He agreed with Dr. Hurley that true general peritonitis was rare and probably very fatal, and pointed out that in the paper he had purposely defined the type of condition that had been classed as general peritonitis.

In Table VI of his paper it should be noted that five definite abscesses were included amongst the cases of one day's duration. Obviously they could not have developed in this time, but the patients would not admit to a longer illness, and this showed how insidious the onset might be in some cases.

In closing the discussion, Dr. Gerald Weigall, the President, said that as a general practitioner for many years he had operated on numerous cases of appendicitis and had never had a fatal case.

In semi-humorous vein he suggested that by saving by operation so many lives of young people suffering from appendicitis we might be breeding a race with an increasing tendency to this disease.

NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the Australian Medical Association:

Myers, William Keith, M.B., B.S., 1933 (Univ. Sydney), 5, Selwyn Street, Wollstonecraft.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on June 8, 1934.

Vegetative Regulation.

PROFESSOR C. S. HICKS spoke on the subject of vegetative regulation, in which he grouped together the vegetative nervous system and the endocrine glands, with the hypothalamus as a central regulating mechanism. He pointed out that the recent advances in knowledge of hormones and humoral mechanism generally forced upon us the importance of the chemical *milieu* of the living cells—a fact stressed long ago by Claude Bernard, but since the rise of cellular pathology lost sight of owing to the dominant idea of the morphological localization principle. He stressed the fact that the organism as a whole was vastly more than the sum of its individual parts and that in the conclusion of the activities of the part to secure functional unity, humoral (chemical or physico-chemical) procedures as well as hormonal were necessary as nervous mechanisms. Today Claude Bernard's criterion of constant composition of tissue fluid might be extended to read: "Departures from the constancy of the *milieu* are the decisive causes of definite diseased states", for example, tetany, diabetes, rickets, goitre (Hoff).

By means of a scheme based upon the researches of Hoff on the body reactions to non-specific protein therapy it was demonstrated that the whole vegetative regulation system was so interlocked that changes in one factor affected all the others, so that it was possible to foresee what would be the outcome of over- or under-action of any one factor; for example, the thyroid threw the body

mechanism into sympathetic over-action, so that acidosis, rise in serum calcium and myelocyte leucocytosis, rise of body temperature and metabolic rate were associated.

The work of Hoff on the experimental production of such correlated changes was quoted, notably the result of injection of bacterial toxins in man. The involvement of the hypothalamus as governing centre of the vegetative nervous system was indicated, and a carefully studied series of reactions following injections into the third ventricle for encephalography in a human subject.

All the expected changes occurred, involving such diverse responses as alteration in alkali reserve, blood sugar, Arnett count, lymphocyte count, body temperature and blood potassium and blood pressure.

Obituary.

MICHAEL O'GORMAN HUGHES.

DR. MICHAEL O'GORMAN HUGHES, whose death was recently reported in this journal, was born on September 23, 1871. His education was commenced at Riverview College and at Saint Aloysius's College. He studied in the Faculty of Arts at the University of Sydney and graduated with first class honours in French and English in 1890. He took his degree as Bachelor of Science in 1893 and graduated in medicine with second class honours in 1895. After graduation he became resident medical officer at Saint Vincent's Hospital, Sydney, and thus began a period of service that continued until his death. He was for many years honorary surgeon at that hospital and held the position with benefit to the hospital and with honour to himself. He rendered valuable service to the Hospice for the Dying for a period of thirty years. During the war he served at the Randwick Base Hospital, Sydney. He was highly esteemed by his colleagues and will be remembered with affection by all who came into close contact with him.

One of his former colleagues, who wishes to remain anonymous, writes:

Michael O'Gorman Hughes, after a long and trying illness, died a few weeks ago, and those of us who were his friends or colleagues remember him with affection and respect. He was no mere medical tradesman, for he had taken the degrees of B.A. and M.B. both with honours; he was also a Bachelor of Science, all of the University of Sydney, and actually possessed the knowledge these distinctions sometimes connote. He was first connected with Saint Vincent's Hospital as house surgeon and later joined the honorary staff there on the surgical side. For many years, in company with the late Dr. Charles Maher, he served the Hospice for the Dying, and during the period of the war he was surgeon to the Randwick Hospital. Dr. Hughes was a really learned and capable all-round medical man, but his interests, as years passed and experience increased lay chiefly in surgical

work. He was a sound, careful operator and a diagnostician of common sense and good judgement. The writer remembers his abilities best in regard to the treatment of goitre. His care, gentleness and skill were there well shown in the management of such cases, where so many things may go wrong before, during and after the operation itself.

O'Gorman Hughes was one of those men who go through life without brilliant material professional success. He was indeed not the type of man to attract a large clientele either of the public or the profession. Nevertheless, his knowledge and ability deserved more recognition than they received. He was, if one may so say, a poor window-dresser, but those of us who knew him and his work best were quite aware that he was a man on whose word one might rely, who always, with it must be admitted, an occasional grumble, played the game and who was a safe, wise and capable surgeon.

Correspondence.

TOXIC GOITRE.

SIR: The child-like faith of Dr. Sydney Pern, as expressed in his letter published in THE MEDICAL JOURNAL OF AUSTRALIA of 8th instant, is most touching.

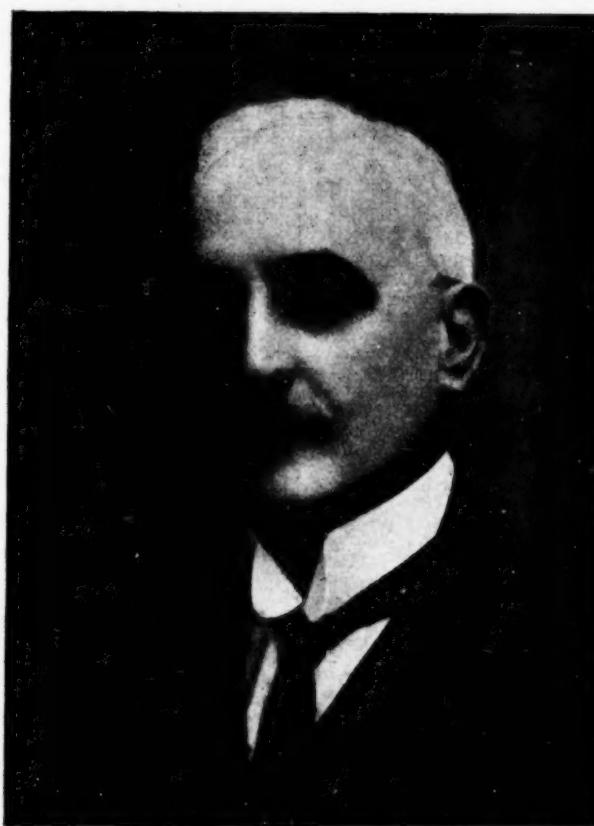
His contention as to focal sepsis being the sole aetiological factor in toxic goitre and its location and removal the means of apparent cure is surely an armchair hobby of his.

It would be interesting to know how many cases of proven toxic goitre he has been able to save from operation in his twenty-eight years' experience and what the subsequent history of his cures, or rather of the patients, has been.

At what stage does Dr. Pern make a diagnosis of toxic goitre and what means does he take to verify his diagnosis?

It is obvious that he has had no experience of fulminating thyrotoxicosis when he states that: "No toxic goitre should ever be allowed to get into the condition when it endangers the patient's life to have tonsils or other foci of sepsis removed". Certainly as regards these as well as the usual primary thyrotoxic states, I quite agree with Dr. George Bell when he advises strongly against any surgical interference other than an attack on the thyroid gland, and the same applies to any of the secondary types other than the very chronic ones of low toxicity. I have seen many edentulous women whose every orifice has been vigorously assailed in the hunt for focal sepsis, whose thyrotoxic condition has continued to advance to such a stage (often despite X ray treatment) as brought them fibrillating, breathless, bedridden, and oedematous to hospital for cure by surgery. Such cases cannot be cured, but often they can be patched up.

It seems galling to those of us who are actively engaged in dealing with this problem and who are teaching and preaching the doctrine of early diagnosis and treatment along lines approved the world over, to see such dog-



matism put forward by a man of mature years in whom a balanced judgement is to be expected.

Still there is one ray of sunshine in his ideas, as he states: "The accepted attitude seems to be that once a thyroid gland is diseased it will remain so for all time. If this attitude is correct, the removal of a large portion of the thyroid is justifiable."

Surely there is ample proof that this is so, and if Dr. Pern doubts it, why not visit the Royal Prince Alfred Hospital (for which I can vouch personally) or some of the large public hospitals in Melbourne and go into the whole matter with case records, microscopic sections and follow up post-operative cases? He would doubtless be surprised to find healthy living men and women years after partial thyroidectomy as the only removal of "focus", septic or otherwise.

Yours, etc.,

HUGH R. G. POATE.

225, Macquarie Street,

Sydney,

September 13, 1934.

AN ASSOCIATION OF RADIOLOGISTS.

SIR: At the meeting of the Federal Council of the British Medical Association in Australia, as reported in this journal of September 15, adverse comment was apparently made about the formation of scientific bodies outside the ranks of the British Medical Association.

We feel that the members of the Federal Council are not fully acquainted with the articles of the proposed Australian and New Zealand Association of Radiology.

In the formation of this body due consideration has been given to the assistance and cooperation that radiology and allied sciences receive from persons not eligible for membership of the British Medical Association, and the constitution provides for three classes of membership. Firstly, ordinary members consisting of all qualified medical practitioners engaged in the practice or teaching of these sciences. Secondly, associate members who are members of the teaching staffs (not necessarily medical in character) of the universities, and all graduates and students of Australian and New Zealand universities. Thirdly, technical members defined as persons not being qualified medical practitioners, and not being eligible for election as associate members, who are engaged in the manufacture or distribution of radiological apparatus or who are engaged as technical assistants to members or associate members or under the supervision of members at hospitals.

From the above it can be seen that by no manner of means could this scientific body be anything but outside the British Medical Association, and also it can be seen that it is not a special association formed within the profession.

It is to be hoped that the committee formed by the Federal Council will make it their duty to ask for evidence from the bodies that may be criticized before forwarding their recommendations to the next meeting of the Council.

A résumé of the objects and articles of association will be forwarded to the medical journals by the Australian and New Zealand Association of Radiology immediately the Crown Law Office has approved of its constitution.

Yours, etc.,

A. T. NISBET.

British Medical Association House,

Macquarie Street,

Sydney,

September 14, 1934.

FOOD IN HEALTH AND DISEASE.

SIR: In an otherwise well written and interesting review of Miss Thoma's book on page 355 of the journal of September 15, there is one paragraph that should not be allowed to pass unchallenged. The reviewer takes Miss Thoma to task for not mentioning alcohol in a book on

dietetics. But why should it be included? The only claim that alcohol can make as a food is that when the liver detoxicates it (by oxidation), a few calories are produced. This insignificant production of heat is far overbalanced by the toxic action, and alcohol can have no part in scientific dietetics; nor is it easy to see why repeal, or any other action of politicians, can give alcohol a food value it did not have before.

The reviewer then goes on to praise the use of alcohol in therapeutics and becomes reminiscent. My elderly friends also have told me of the time when alcohol was used freely in the wards, but this is only of historical interest now, since at every hospital in the Empire the therapeutic use of alcohol has reached a vanishing point. Granted that alcohol may be used in the treatment of a few conditions, it remains that for every indication there is something else better. For the example he quotes, of (presumably) a convalescent with weak digestion, his patient would make speedier progress if instead of alcohol he was given vitamin preparations or strychnine or acid or iron, malt, glucose *et cetera*, according to the individual need. One time above all others when alcohol should not be given is in convalescence, for at no other time is it so easy to start the habit.

The paragraph is redeemed (accidentally though it may be) by one true statement: "Wines, beers, and all liqueurs . . . all of which may serve to jade the tired palate." The use of alcohol is certainly a leading cause of jaded and tired palates as well as of impaired digestion.

Emphatically, alcohol in dietetics is a delusion, and in therapeutics an anachronism.

Yours, etc.,

EDWARD H. DERRICK, M.D.

259, Kelvin Grove Road,

Kelvin Grove,

Brisbane,

September 20, 1934.

NEWSPAPER PUBLICITY AND THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS.

SIR: Certain paragraphs in the report of the proceedings of the Federal Council, published in your issue of September 15, are headed "Newspaper Publicity and Royal Australasian College of Surgeons". It is stated "that the South Australian Branch forwarded cuttings from Adelaide papers and suggested that the Royal Australasian College of Surgeons should be informed that it was desirable that matters of professional interest only should not appear in the lay Press. The Branch also suggested that the College should be approached, and asked that, if public lectures were to be published in the lay Press, the interests of the whole profession should be conserved." It is also stated "that, after discussion, it was resolved that the Royal Australasian College of Surgeons should be written to and should be informed of the steps that were proposed regarding the publication of Congress proceedings in the lay Press and that the College should be asked whether it could see its way to adopting similar methods".

The Council of the College is anxious to cooperate with the Councils of the British Medical Association in Australia and in New Zealand in any activity which is intended to improve the practice of medicine in these countries, and the matters referred to in the report quoted above are being dealt with by correspondence between it and the Federal Council of the British Medical Association.

In view of the publication of the report in your journal and the fact that there will not be another meeting of the Federal Council of the British Medical Association for six months, I am directed to announce that:

(a) The Council of the Royal Australasian College of Surgeons is in accord with every statement made by the President in his address and is reluctant to believe that this address can be the cause of a complaint from any executive body of the British Medical Association, because it feels confident that the public expression of the ideals of professional conduct expressed therein must be upheld by every member of the medical profession.

(b) The Council of the Royal Australasian College of Surgeons was distressed by the publication, in the daily Press, of details of the clinical work of the meeting. This publication was unauthorized and steps are being taken to prevent a repetition of this occurrence at future meetings.

Yours, etc.,

JULIAN SMITH, Junior,

Honorary Secretary, Royal Australasian College of Surgeons.

6, Collins Street,
Melbourne,

September 21, 1934.

RASPUTIN'S DEATH.

SIR: Dr. Wilkes, in *The British Medical Journal*, July 28, 1934, suggests that Dr. Lazovert must have bungled his job and that Rasputin was probably not given the cakes poisoned with cyanide. Well, that reminds me! Twenty years ago, when perhaps less skilled in the lethal art, I had to terminate immediately and so painlessly the days of an old dog, Cosmos, wearied of this fretful fever, and cyanide seemed the obvious choice. I obtained some potassium cyanide, which I applied freely to a piece of meat—enough indeed to kill Cosmos and all his vagabond friends—and gave it to the dog to eat, which he did quite readily. I expected his immediate dissolution, but instead, he cast at me a reproachful stare, and after quite a long interval returned the treacherous morsel at my feet. I too had bungled the job and, making full allowances for the vomiting, wondered whether overdosage could cause delay, if not default. Such a possibility seems fantastic and is untenable, so perhaps it would be wiser in seeking for an explanation to follow the toxicologist and speculate as follows.

Perchance that reproachful look was evidence of a temporary achylia (compare Alexis) inhibiting through the absence of acid the liberation of hydrocyanic acid. Further, Cosmos was not at all fastidious in regard to his food and, being more or less toothless, must have subjected his gastric membrane to so many daily insults that, like Rasputin, he also achieved a chronic gastritis. This condition also would prevent both liberation and absorption of the deadly cyanide. The protection given by wine need not be entertained, for, if Cosmos had any, it was not with my knowledge or consent. Unlike Rasputin, it was not necessary to shoot Cosmos, for he finally succumbed, but after a most distressing interval.

Yours, etc.,

W. McDONALD.

183, Liverpool Street,
Sydney,
Undated.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts*, 1925 to 1933, of Queensland, as duly qualified medical practitioners:

Clouston, Thomas Bennett, M.B., 1905 (Univ. Sydney), Mackay.

Shiels, Douglas Oswald, M.B., B.S., 1933 (Univ. Melbourne), Mount Isa.

Additional qualification:

Johnson, Horace William, M.R.C.P., 1934 (Edinburgh), Brisbane.

Public Health.

POLIOMYELITIS IN VICTORIA.

Dr. JOHN DALE, Medical Officer of Health of the City of Melbourne, and Chairman of the Medical Committee controlling the Poliomyelitis Campaign, has forwarded the following report of the medical officer to the committee for the year 1933-1934.

Incidence of Poliomyelitis.

During the year under review the number of cases of poliomyelitis was very small until March, 1934, when the infection became much more active and assumed epidemic form in April and May. After a short, sharp course the number of cases reported for the State rapidly fell again during the month of June.

The actual figures are:

| | 1933. | 1934. |
|-----------|-------|----------|
| July | Nil | January |
| August | Nil | February |
| September | Nil | March |
| October | 2 | April |
| November | 3 | May |
| December | 2 | June |

Of the total of 154 patients eighty were treated with serum, fifty-nine were paralysed on admission and no serum was used, while in fifteen instances the final details are not yet to hand. These cases were as under:

| Total Cases. | Recovered (No Paralysis Evident). | Improving (Paralysis Present). | Died. |
|--|--------------------------------------|-----------------------------------|-------|
| No serum, 59: | | | |
| Country | 1 | 23 | 11 |
| Metropolitan | 2 | 31 | 12 |
| Serum, 80: | | | |
| Country— | | | |
| (a) Given with some paralysed present | 0 | 6 | 0 |
| (b) Given before any paralysed evident | 7 | 3 | 11 |
| Metropolitan— | | | |
| (a) Given with some paralysed present | 1 | 16 | 28 |
| (b) Given before any paralysed evident | 36 | 7 | 11 |

¹ Regarded as polioencephalitis; final diagnosis doubtful.

² Regarded as polioencephalitis definitely.

³ Both very acute cases with extensive paralysis on admission. Serum given with hope of checking further spread.

With the sudden increase in the number of notifications in April there was a resultant depletion in serum stocks and the supply of convalescent serum was replenished in May. In addition, a quantity of the pooled human serum previously prepared was used in a small number of cases at the Children's and the Alfred Hospitals with apparently quite satisfactory results.

Stocks of serum are held, as before, at country centres in charge of the practitioners named: Ballarat Hospital (Medical Superintendent), Bendigo Hospital (Medical Superintendent), Colac (Dr. K. McK. Doig), Dimboola (Dr. F. A. Bouvier), Echuca (Dr. D. M. Brown), Geelong Hospital (Medical Superintendent), Hamilton (Dr. P. B. Houghton), Maffra (Dr. G. M. Haydon), Mildura (Dr. D. M. Seeley), Moe (Dr. J. F. F. Drew), Mooroopna Hospital (Medical Superintendent), Swan Hill (Dr. F. E. Browne), Wangaratta Hospital (Medical Superintendent), Warrnambool (Dr. A. E. Brauer), Yarram (Dr. J. H. Rutter).

Cooperation of Practitioners Throughout the State.

I should like to record my deep appreciation of the support given by the medical superintendents of the public

hospitals, both metropolitan and country, and of the medical practitioners throughout the State in supplying full clinical notes of the patients notified and the details of their response to treatment.

ROBERT SOUTHBY, M.D., B.S.,
Medical Officer to the Poliomyelitis
164, Victoria Street,
North Melbourne, N.S.
July 26, 1934.

Books Received.

MASSAGE AND REMEDIAL EXERCISES IN MEDICAL AND SURGICAL CONDITIONS, by N. M. Tidy; Second Edition; 1934. Bristol: John Wright and Sons, Limited. Demy 8vo, pp. 442, with illustrations. Price: 15s. net.
COMPANIONATE MARRIAGE FROM THE MEDICAL AND SOCIAL ASPECTS, by J. A. Goldsmith, M.B., 1934. London: William Heinemann (Medical Books) Limited; Australia: Angus and Robertson. Crown 8vo, pp. 62. Price: 2s. 6d. net.
THE NATURE OF DISEASE JOURNAL, by J. E. R. McDonagh, F.R.C.S.; Volume III; 1934. London: William Heinemann (Medical Books) Limited. Crown 4to, pp. 245. Price: 10s. 6d. net.

Diary for the Month.

OCT. 2.—Tasmanian Branch, B.M.A.: Council.
Oct. 2.—New South Wales Branch, B.M.A.: Council.
Oct. 3.—Victorian Branch, B.M.A.: Branch.
Oct. 3.—Western Australian Branch, B.M.A.: Council.
Oct. 4.—South Australian Branch, B.M.A.: Council.
Oct. 5.—Queensland Branch, B.M.A.: Branch.
Oct. 5.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates of Local Associations.
Oct. 9.—Tasmanian Branch, B.M.A.: Branch.
Oct. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Oct. 12.—Queensland Branch, B.M.A.: Council.
Oct. 16.—Tasmanian Branch, B.M.A.: Council.
Oct. 16.—New South Wales Branch, B.M.A.: Ethics Committee.
Oct. 17.—Western Australian Branch, B.M.A.: Branch.
Oct. 17.—Victorian Branch, B.M.A.: Clinical Meeting.
Oct. 18.—New South Wales Branch, B.M.A.: Clinical Meeting.
Oct. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Oct. 24.—Victorian Branch, B.M.A.: Council.
Oct. 25.—New South Wales Branch, B.M.A.: Branch.
Oct. 25.—South Australian Branch, B.M.A.: Branch.
Oct. 28.—Queensland Branch, B.M.A.: Council.

Medical Appointments.

Dr. J. P. C. Madden (B.M.A.) has been appointed Government Medical Officer at Mungindi, New South Wales.

The undermentioned appointments have been made to the Honorary Medical Staff, Lidcombe State Hospital and Home, New South Wales; Dr. E. C. Hall (B.M.A.), Honorary Dermatologist; Dr. A. E. F. Chaffer, Honorary Ophthalmic Surgeon.

Dr. J. G. Drew (B.M.A.) has been appointed Deputy Commissioner of Public Health and Deputy Inspector, School of Anatomy, pursuant to the provisions of *The Health Acts*, 1900 to 1931, Queensland.

Medical Appointments Vacant, etc.

Few announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xiii, xiv.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.
PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Resident Medical Officers.
RENWICK HOSPITAL FOR INFANTS, SUMMER HILL, SYDNEY, NEW SOUTH WALES: Resident Medical Officer.
THE BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Clinical Assistant.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square London, W.C.1.

| BRANCH. | APPOINTMENTS. |
|---|---|
| NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney. | Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society. |
| VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne. | All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria. |
| QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane. | Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr. |
| SOUTH AUSTRALIAN: Honorary Secretary, 207, North Terrace, Adelaide. | Combined Friendly Societies, Clarendon and Kangarilla districts. Officer of Health, District Council of Elliston. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia. |
| WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth. | All Contract Practice Appointments in Western Australia. |
| NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington. | Friendly Society Lodges, Wellington, New Zealand. |

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